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Perhaps you'd like more information. Or if you have difficulty in figuring size, or finish, or anything, just call on one of our cable specialists. He'll be glad to help. You can reach him through the nearest G-E distributor, or G-E sales office, or write direct to General Electric, Dept. 6A-201, Schenectady, N. Y.

520-86

GENERAL ELECTRIC

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Established 1901

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The Electragist and Electrical Record

Vol. 35 **November, 1936** No. 13

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EC
NOVEMBER 1936

Prosperity

THE election is over and we can now get back to the important thought that business after all is to a considerable extent what we ourselves make it. The prosperity of the United States is not dependent upon the election of any man as president. The seeds of the depression were sown during the years of prosperity when credit was unduly expanded. Until that was corrected and the weak places in the business structure strengthened, the trend was downward.

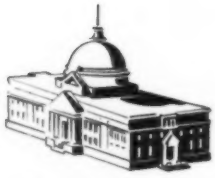
FOR more than two years the trend has been definitely upwards. Business is better. There is a shortage of skilled labor in almost every industry. Earnings are improving. Dividends are larger. In fact business is on its way not only to equal the former record but, as it has always done, to surpass it. There may be some periods of let down in industrial activity but they will not be of long duration nor will they alter the upward swing.

IN other words, the United States, during the depression years of lessened activity, built up a tremendous backlog of business. In that time it developed new ideas of safety, pleasure, economy and utility. These have rendered much of our former possessions obsolete. Our job, therefore, is one of catching up with ourselves.

IN the field of construction is this especially true. The residential building situation has been well publicized but the conditions in the industrial field are even more acute. Modernization has gone forward to a considerable extent which must necessarily be followed by new construction when factories get busy. Commercial building work has hardly started but it cannot be held back much longer.

THE tide of business recovery is incoming. It is the period that all of us have been looking for during the past five or six years. The time is not far off when we shall again have a seller's market. May we profit by our past mistakes and take advantage of the golden opportunity that lies ahead.

Jobs are there for alert electrical contractors



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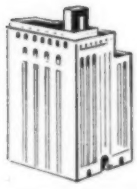
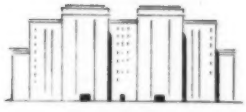


HOUSING PROJECT

SCHOOLS



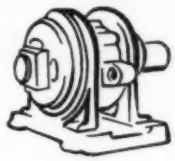
HOSPITALS

THE construction industry is coming back to life. For the first time in years, sizeable funds are being made available for construction projects large and small, public and private. These projects mean more and more jobs for electrical contractors if they go out after these jobs.

The contractor's opportunities will be varied in scope. It may be a simple remodelling job. Or it may be a large scale public building project.

Naturally, electrical equipment will be needed. Quickly and economically. The contractor must have a dependable source of supply, geared to his needs.

Graybar fulfills this need. It brings to electrical contractors an experienced service of supply equal to any requirement and including anything and everything electrical. It brings, too, a 67 year old reputation for dependable materials—a reputation that will back up the reliable contractor's own good reputation.



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ELECTRICAL CONTRACTING

Vol. 35 NOVEMBER, 1936 No. 13

▲

S. B. Williams, Editor

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FIELD BRIEFS

● THE EFFICIENCY of incandescent lamps is only about 4 per cent, according to L. A. Hawkins at the recent I.E.S. convention, while sodium and mercury vapor lamps have an efficiency from two to three times greater. The sodium lamp has greater possibilities of improved efficiency because so much of its light is in the visible spectrum.

● RELIEF LABOR can be rather expensive. An Ohio electrical contractor recently tried to man a job with electricians who were on relief. Outside of the delay and the red tape necessary to get these men released, he found that his labor costs with this class of labor were increased approximately 100 per cent.

● THE AVERAGE COST of house wiring for rural customers is $69, according to a survey recently completed by the Edison Electric Institute covering 152,520 new customers. The average cost per mile to construct lines to serve rural customers in 1936 has been $910 for lines only and $343 additional for meters, services and transformers, a total of $1,253.

● THE FIRE MARSHAL'S inspection force of Dallas, Tex., makes reports to the electrical inspection department of all electrical hazards that are encountered. These reports cover bridged fuses, wires hung on nails, cord extension wiring, overheated motors, etc.

● "ADEQUATE INSTALLATIONS with standard materials" is the slogan to be found typed on the letterhead of the newly formed Carolinas' Association of Electrical Contractors.

● WHAT IS CLAIMED to be the largest totally concealed explosion-proof wiring installation of record is nearing completion at Louisville, Ky. A distillery plant comprising fourteen or more buildings is being wired by the Beltzhoover Electric Co. of Cincinnati, O.

● OVERHEAD AMONG UNION electrical contractors in New York City based upon labor payroll was 48.4 per cent in 1935. This figure was determined in a survey conducted by the Voluntary Code Committee for the Electrical Construction Industry of New York City and compares with 32.6 per cent in 1929, 55.9 per cent in 1933, and 88.4 per cent in 1934.

● DELEGATES to the convention of the electrical industry of the Rocky Mountain states at Santa Fe, N. M., in September wore replicas of the I.E.S. lamp tag as badges with a "Sight-Saving Pledge" printed thereon.

● NEW OUTSIDE AIDS to adequate wiring: Purdue University low-cost experimental homes designed so all circuits can operate on 10-amp. fuses; the Kelvin Home, an electric home, promoted by Kelvinator Corp. to promote air conditioning; *Better Homes and Gardens* better kitchen contest in which more than 2500 home-owners have already enrolled.

UMI

N.E.C.A. Holds Fine Business Convention

COMPENSATING differentials, voluntary agreements and the financing of association operations through a new scale of graduated dues were the high spots in the discussion at the thirty-fourth annual convention of the National Electrical Contractors Association held on October 12, 13 and 14 at the Atlanta-Biltmore Hotel, Atlanta, Ga. Delegates from twenty-four states and Canada attended the sessions of what was one of the best conventions ever held by the Association from the standpoint of sustained interest.

An exceptionally large number of ladies attended the convention and for them the Atlanta committee provided a program of entertainment that was highly praised by everyone.

The improved business conditions were evidenced by the large number of manufacturers and their representatives who registered, many of whom had displays.

Refinancing

The necessity for rebuilding the membership and strengthening the financial position of the Association was brought to the attention of the convention by several speakers. It was stressed by President Earl N. Peak in his address at the opening session. The report of General Manager Laurence W. Davis went into the details of the Association's present position showing that unless some action was taken the assets of the Association would be all used up in approximately another two years. T. W. Wilmer, Richmond, Va., presented a paper entitled "Some Thoughts on the Building of N.E.C.A." in which he urged the building up of a membership of 4000 to provide the necessary funds with which to carry on. R. M. Walker, Atlanta, Ga., at the conclusion of his report as chairman of the Distribution Committee, suggested high voluntary dues in the form of sustaining memberships. A plan for adequately financing the Association was presented by A. Lincoln Bush, New York, N. Y., the basis of which is a graduated scale of dues based upon volume of business. The schedule suggested by Mr. Bush and the number of members that the Association might reasonably be expected to have in each class is as follows:

Class	Suggested Dues	No. of Members	Revenue
a—$15,000	$15	300	$4,500
b— 15,000– 25,000 ..	25	300	7,500
c— 25,000– 50,000 ..	35	300	10,500
d— 50,000–100,000 ..	50	100	5,000
e—100,000–150,000 ..	100	50	5,000
f—150,000–200,000 ..	125	50	6,250
g—200,000–300,000 ..	150	20	3,000
h—300,000–400,000 ..	200	14	2,800
i—400,000–700,000 ..	300	10	3,000
j—700,000–1,000,000.	400	4	1,600
k—1,000,000 and over	500	2	1,000
Total		1,150	$50,150

After considerable discussion, particularly with respect to the dues in the first three brackets, it was voted to refer the entire matter to the Executive Committee with power so that a new basis for dues may be set up prior to January 1, 1937.

The report of Mr. Davis showed 1035 members in good standing and 193 others who have paid something on account of their 1936 dues. Dues for the first nine months amounted to $15,027.50 and other income brought the total revenue to $18,-918.22. Against this has been an operating expense of $34,857. Assets have shrunk from $70,146 to $53,-207.

"If the Association is to carry on the activities and services which it is now giving to its membership," Mr. Davis stated, "and continues to show the present deficit between its operating budget and its income, it is obvious that in approximately two years time the capital of the Association will be consumed and further continuance will be impossible."

This subject brought out considerable discussion which, in general, was to the effect that more field contact with local associations was necessary, that a larger membership could be had if the members would get out and work, that the Association will get the support of the rest of the industry when the members show that it is deserved, that more gains will be made in numerical strength when the Association program helps to reduce the contractors' competition from the other branches of the industry.

Association Activities

The numerous activities of the Association were outlined by President Peak. These included analyses of the Social Security Act and of state unemployment insurance acts, preparation and distribution of a "Voluntary Agreement of Fair Competition", preparation and distribution of a bidding practice plan, creation of the Simplified Business Record System, cooperation with REA, compilation of the new Manual of Labor Units, distribution of the monthly bulletin entitled "The Qualified Electrical Contractor", progress by the committee on distribution, inauguration of the industry coordination movement.

A display on boards of the services which the Association has available

Rival boosters—W. W. "Bob" Ingalls of Miami, Fla., (left) and A. L. Stone of Los Angeles, Calif.

Ralph M. Walker, Atlanta, Ga., and H. F. Fischbach, New York, N. Y.

F. S. Berry, Chicago, Ill., and J. M. Clayton, Atlanta, Ga.

for members including forms, estimating manual, accounting systems and ELECTRICAL CONTRACTING was arranged on both sides of the meeting room. This display was made up by G. W. Patterson, executive committeeman from Toronto.

The first morning's session closed with a demonstration lasting one hour on "New Horizons in Lighting" by Samuel G. Hibben, director of applied lighting, Westinghouse Lamp Company, Bloomfield, N. J., wherein was shown the rapid strides now being made in the field of ionized gas illuminants.

Crossing Signals Report

The report of the Committee on Highway Crossing Signals by J. W. Collins of Chicago, Ill., chairman, reviewed the difficulty Illinois contractors had had in trying to submit bids on signal installations at light crossings, the money for which had been appropriated by the federal government and allocated to the states. The railroads are said to be getting this work but without the same restrictions as apply to contractors. A test case asking that the State of Illinois be enjoined from paying the railroads for work already done on the grounds that competitive bids were not taken has been filed in the Circuit Court of Cook County and referred to a master in chancery. A decision is expected soon which, if favorable, is expected to throw this market open to bidding by electrical contractors.

Under the title "Building Economic Trade Relations", R. M. Walker, Atlanta, Ga., chairman of the Distribution Committee, discussed contractor differentials and, as was the case at Chicago last year, it again aroused considerable interest, so much so in fact that an extra luncheon meeting for contractors was held because there was not enough time at the regular session to accommodate everyone who wished to talk.

Mr. Walker pointed out that a contractor was not entitled to a differential unless he qualified by rendering a sales service for the manufacturer. He believed that when contractors organized locally, and then by states with membership in the national, and pledged themselves to render a real sales service they would receive from the manufacturers the recognition to which they would be entitled. He urged the contractors to work to that end and earn the differentials that they are seeking. He pointed out that while the results were not all that had been hoped for, there "has unquestionably been tremendous progress" and that the sympathy and support of high officials of other branches of the industry had been enlisted to bring about the kind of relationship desired.

In the discussion the Robinson-Patman Act was brought up and the statement was made that the Association is preparing test cases in different parts of the country against manufacturers and some contractor-jobbers.

N. Y. Voluntary Code

R. A. Goeller, president, New York Electrical Contractors Association, Inc., in a paper entitled "The Contractors' Competitive Behavior and Their Responsibility to the Public," outlined the operations of the voluntary code as New York's answer to the challenge of disorganization in industry and the problem of self regulation. The code, which has been in operation since October 1, 1935, includes all closed shop contracting employees regardless of association affiliation.

In setting up this code, the New York contractors acted on the principle that any association of business men, in order to protect the mutual interests of themselves and the public alike, must act to improve competition instead of destroying it. For that reason, the major purposes and accomplishments of the code, Mr. Goeller stated have been as follows:

"In the first place, its purpose is to provide the public with adequate competition on a fair basis. It sets up a standard of competitive behavior in respect to overhead that insures the purchaser a fair charge for his work.

"Prices are stabilized, so that scrupulous investors are protected against unscrupulous ones.

"Credit is improved; suppliers are paid for their merchandise; bonding companies gain; and labor is greatly benefited.

"Under this plan the purchaser is safe-guarded on extra work, which is carried on under the same minimum percentage requirements as though the work were competitive.

"Through the activities of the Code, the contracting fraternity is reducing unfair competition to a point where prices are on a sound level, and the investing and buying public can be assured of stabilization, which is not possible from an industry offering a level of prices built on the quicksand of bankruptcy and creditors' losses, and possibly downright dishonesty."

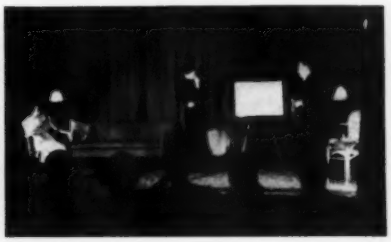
State Associations

Four reports on organization activities were made on the Georgia, Iowa and Carolinas' Associations and the Los Angeles Chapter.

The Georgia Electrical Contractors Association, Vice-President K. D. White of Columbus stated in his report, was reorganized in June 1935 with the following eleven objectives: Fair trade relations; greater use of electrical equipment and appliances; good will between contractors and strong local associations; better workmanship and standard materials with due regard to lower costs and safety; cooperation with the rest of

F. C. Michael, Gastonia, N. C., J. Mack Woodside, Charlotte, N. C., Y. P. King, W. W. Hanks, Charlotte, N. C., and Harry Taylor, Greensboro, N. C.

"Let There Be Outlets"—a playlet by J. Walter Collins.



C. J. Caywood, H. A. Hood, Houston, Tex., Eddie DeLaney, Galveston, Tex., R. Fischl, Dallas, Tex., J. S. Copeland, Houston, Tex., R. E. Libecap, Dallas, Tex., and their ladies.

UMI

G. W. Patterson, Toronto, Ont.

Floyd A. Wallace, Des Moines, Ia.

the industry; adequate differentials; a place in the sun for the contractor and dealer; assistance to N.E.C.A. in its program; educational work in estimating, accounting, cost finding; improvement of merchandising conditions; restoration of electrical business to contractors and dealers through cooperation with other branches of the industry.

The association has an executive committee made up of one contractor for each of the larger cities. Dues are $6.00 a year payable semi-annually.

"Organization work," said Mr. White, "is made much easier if you can refer to constructive activities sponsored by the organization and I recommend to you the Voluntary Agreement Plan of Fair Competition as being a plan which encourages intelligent competition and which provides adequate income for the support of the local group and its activities."

Los Angeles Activities

As the result of the visit of President Peak to Los Angeles this spring A. L. Stone, president of the Los Angeles Branch of the Southern California Chapter, N.E.C.A., stated in his report, there was set up an industry coordinating committee which after diagnosing the industry ailments called together twenty-four key men to meet in the offices of the Electrical Contractors Association and to pledge their active support. That support has been enthusiastically adhered to. Prior to this there had scarcely been any meetings between the contractors and the other groups, but now it is a common occurrence, and most of the meetings are held in the contractors' offices.

One of the first activities of the Co-ordinating Committee was the redrafting of the Los Angeles electrical ordinance. Three qualified men were selected to work full time on this, and the job is practically completed now after 14 weeks of hard work. The cost of this work was practically $3500, the entire financing being arranged by the Co-ordinating Committee. It is the first time that all branches of the industry in Los Angeles, Mr. Stone stated, have been united on their electrical ordinance. This is only one of the activities being promoted by the committee.

The idea back of the plan is for each individual group to finance, if possible, their own activity, and if not, the League will assume this part of the job. The opinion seems to be quite prevalent that the big job will have to be done through the contractor.

Floyd A. Wallace, state manager, reporting for the Iowa Association of Electrical Contractor-Dealers, stated that a state-wide drive for membership had recently gotten under way. The hearty approval given to the "Qualified Contractor Plan", to the matter of industry coordination, and to the favorable attitude of power company executives toward a strong state representation of qualified members indicates that state-wide interest has been definitely aroused. The Des Moines association accomplished the strengthening of its inspection enforcement after several years of laxity had gone unheeded mainly because the local contractors were not organized. The profitable results of this one activity were pointed out as an example of the value to contractors working together in constructive industry effort.

C. J. Harder, New York, N. Y.

R. A. Goeller, New York, N. Y.

The Carolinas' Association of Electrical Contractors, Treasurer R. H. Bouligny, Charlotte, N. C., reported, now has 75 members which number will be doubled in the next six months. They have a paid secretary who gives most of his time to developing local associations.

The association is accepting no outside financial assistance, the first year's operations being underwritten by contracting leaders. The cooperation of the utilities has been asked in the development of programs and of the wholesalers in supporting the contractors.

An industry council of five each from the utilities, wholesalers, and contractors has been formed to iron out misunderstandings and make plans for cooperative activities.

The voluntary agreement is being set up as basic for association work but it will not be placed in operation in any locality until that local association is ready for it.

Labor Units Manual

The new Manual of Labor Units was presented to the convention by George W. Patterson of Toronto, Ontario, chairman of the Cost Data Committee, as the "most important tool on the job". It started out in September with 12 sections, 24 pages, and 271 subjects. It is planned to add to it each month.

The new manual is a quick, loose-leaf, ready reference and contains tables only, no text matter. It is an offshoot of the present Electragist Estimating Manual which contains an explanation of how to estimate.

All of the tables are based on a minimum of labor under ideal conditions. If conditions are unusual there is a table to add various percentages and also a table to add various percentages for the size and complexity of the job, and another giving percentages for the various types of general contractors. These factors are added to the branch circuit and outlet boxes as these are the only part of a job seriously affected.

Services, switchboards, risers, panels, pulling wire or cable, finishing devices usually can be carried out according to pre-arranged schedule.

The units are all in man hours—and so they can apply anywhere.

Joseph A. Pope, Cincinnati, O.

H. W. Kellams, Washington, D. C.

The new Simplified Business Record System was explained by General Manager Davis in detail. Sample pages, trial balance and profit and loss sheets, which had been filled out and enlarged many times, were used to show exactly how the system works.

A carefully prepared analysis of "The Contractors' Viewpoint of Industry Distribution Problems" by Joseph C. Fitts, secretary, Heating, Piping and Air Conditioning Contractors National Association, presented a sales platform of ten planks that recognized the dual function of a contractor as seller and installer. This platform also causes the contractor to recognize his responsibility for sales creation, both individually and as association and sets up an approach to selling.

Boston School

The results of the highly successful contractor-dealer merchandising school held this spring by the Boston Edison Company were outlined by J. J. Caddigan. Prior to starting the school, which lasted for twelve weeks, the contractor merchandise sales through the company amounted to $3,000 a month. After the school, they jumped to $20,000 a month and stayed there. This refers only to sales put through the company where the contractor had no other means of financing. On these sales amounting to $123,669 since the school, the company paid out to the contractors in commissions $17,000. Another school is being planned for this fall when a substantial amount of time will be given to the selling of wiring.

A pleasant break in the program was offered by a humorous playlet entitled "Let There be Outlets" written and directed by J. W. Collins, secretary of the Electrical Contractors Association of Chicago. The playlet is a lampoon of the extremes to which tenants must go with flexible cords in underwired apartments. In the end all is well because the tenant is shown why it is to his advantage to buy surface extension wiring. Assisting Mr. Collins in the cast were Miss Eleanor Clarkson and Thomas Domville.

R. Edenfield, Nashville, Tenn.

Jas. A. Smith, New York, N. Y.

Immediately following was an explanation by O. R. Hogue, Commonwealth Edison Company, of his company's plans for securing a greater adequacy of wiring in residential properties in Chicago. For new buildings and major remodelling work, they are promoting an installation that will give an average of 7.8 current consuming outlets per room. For existing buildings, the figure is 5.4 outlets per major room.

The company found that less than three outlets per major room curtails the use of current and more than three outlets reduces the amount of cord wiring and multiple taps and sockets. To bring the average up to three outlets per room will require the installation of 2,300,000 new and additional outlets which figure the company has set as its five year objective. The installation of these outlets is being sold by the company concealed at three outlets for $4.75 each, and AddHere surface extension at five outlets for $15.00. The work is all turned over to the Chicago Electrical Contractors Association which farms it out to certain of its members who specialize in this work.

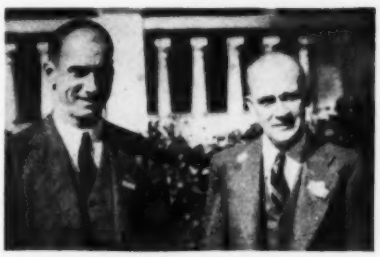
Better Code Understanding

Speaking on "A More Profitable Use and Understanding of the National Electrical Code", George Andrae, Milwaukee, Wis., N.E.C.A. member on the Electrical Committee, N.F.P.A., after outlining how the Code is sponsored and revised, made a strong plea for a better understanding of its provisions by contractors. He pointed to the large sums of money that are wasted each year through violation corrections that need not have happened had the contractors known the Code better.

As a suggestion, he recommended the formation of local code interpreting committees with a representative from the contractors' association, city inspection department, underwriters, labor, and the state industrial commission, where such exists.

Mr. Andrae also criticized what he termed an abuse of competent inspection departments, namely the

Wm. McGuineas and J. N. Pierce, Chicago, Ill.



R. J. Heffernan and G. B. Muench, Louisville, Ky.

securing by incompetent contractors of free engineering service, information and advice and job layouts. The inspector departments, he stated, are not intended to wet-nurse the incompetents.

J. R. Stolzenbach, Baltimore, Md., chairman of the National Motor Section, in his paper entitled "Are Motor Dealers and the Small Local Repair Shops Resigned to Fate?" stressed the importance of the Robinson-Patman Act to the motor dealer. This Act, he said, should bring about a change in the relations between the large electrical manufacturers and their authorized motor dealers. He laid down five planks in a platform to improve the business of the group as follows:

1. The utilities should not sell motors, either used or new. This business should be referred to the local dealer.
2. The motor specialist should be the logical outlet for the bulk of the new motor business to industry and at a fair profit.
3. The manufacturer or the utility should not operate service shops for the maintenance or repairs of industrial power equipment.
4. Every attempt should be made to stabilize rewinding prices at such a profit as to enable the local shops to survive.
5. The requirements and conditions of all members throughout the country should be ascertained and specific action taken to bring about remedies.

George C. Richards, New York, N. Y., representing the Safecote Wire Manufacturers, spoke briefly on protection contracts on wire stating that the manufacturers wish to

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An old-fashioned southern barbecue concluded the convention festivities. Long tables laden with savory food provided for a large outdoor gathering on Wednesday night. The barbecue pit is at the right. Bridge for the ladies and non-golfer men at East Lake Golf Club during the Wednesday afternoon outing.

cooperate in every way with the contractors and that they intend to closely supervise the issuance of such contracts.

Electrical contractors were urged to take the lead in merchandising electrical appliances by J. M. Richardson, Roanoke, Va., in a paper entitled "Electrical Merchandising by Electrical Contractors." Mr. Richardson, who speaks from the experience of a contractor-dealer who has built up a merchandising business of over $150,000 annually in a city of 69,000 population and 19,000 connected meters, said that appliance sales can be made profitable for any contractor who will put them on a merchandising basis. In his instance, he employs a sales manager for his merchandise sales and he has an established training procedure for salesmen, with regular meetings every morning for all members of the retail department. The local power company no longer sells appliances other than ranges and water heaters and gives the local retailer every kind of cooperation.

Industry Cooperation

Industry cooperation, industry teamwork, and industry teamplay through national business development activities, approved first by the four major electrical trade associations, acting through the Electrical Industry Promotion Committee, and sponsored locally, was offered by C. E. Swartzbaugh, vice-chairman, Electrical Industry Promotion Committee, as a formula for progress for the industry. The industry objective, he stated, must be a larger share of the consumer dollar. This can come only when there is cooperation between all groups and in spite of the fact that such cooperation has not existed in the past, it can and will occur when all get together to discuss such non-controversial subjects as business development and the expansion of the electrical market. The new Electrical Industry Promotion Committee offers the medium through which the industry may eventually present a united front in the battle to secure a fair share of the consumer dollar.

As the convention drew to a close, the amendments to the Constitution and By-Laws setting up twelve divisions for executive committee representation with three-year rotation, simplification and clarification of chapter qualifications, dropping of the name Electragist, and simplification of membership qualification were adopted unanimously. The new divisions are:

Division 1. Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

Division 2. New York, New Jersey.

Division 3. Pennsylvania, Delaware, Maryland, District of Columbia.

Division 4. Ohio, West Virginia, Kentucky.

Division 5. Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi.

Division 6. Michigan, Indiana, Illinois, Wisconsin.

Divison 7. Minnesota, Iowa, Missouri, North Dakota, Nebraska, South Dakota, Kansas, Colorado.

Division 8. Arkansas, Louisiana, Oklahoma, Texas, New Mexico.

Division 9. California, Nevada, Arizona.

Division 10. Washington, Oregon, Idaho, Montana, Wyoming, Utah.

Division 11. Eastern Canada: Ontario and Provinces east.

Division 12. Western Canada: Manitoba and Provinces west.

New Executive Committee

To provide for this new geographical breakdown a new Executive Committee was elected as follows:

Division 1, no members were present from the New England states.

Division 2, A. Lincoln Bush, New York, N. Y.

Division 3, Robert W. McChesney, Washington, D. C.

Division 4, E. C. Carlson, Youngstown, O.

Division 5, Ralph M. Walker, Atlanta, Ga.

Division 6, J. Norman Pierce, Chicago, Ill.

Division 7, Harry C. Evans, Kansas City, Mo.

Division 8, H. A. Hood, Houston, Tex.

Division 9, A. L. Stone, Los Angeles, Cal.

Division 10, S. G. Hepler, Seattle, Wash.

Some of the ladies at the Wednesday outing.

Division 11, George W. Patterson, Toronto, Ont.

Division 12, John H. Schumacker, Winnipeg, Man.

The convention went on record as favoring a standard for non-tamperable fuses providing for interchangeability.

Louis Kalischer, Brooklyn, N. Y., vice-president of the Association, presented the report of the Resolutions Committee, which was an appreciation of the cooperation of the speakers, committees, and hosts and hostesses who had combined to make the convention a success.

The passing of H. B. Kirkland was noted by the convention which rose for one minute in respect to his memory.

Los Angeles, Cal., was selected by the committee, of which H. C. Evans, Kansas City, Mo., was chairman, for the 1937 convention at a time and place to be announced later.

Entertainment

The entertainment program expressed southern hospitality to its fullest. Beginning on Monday evening with a dance in the Georgian ballroom and followed on Tuesday evening with the annual banquet and dance, the final event consisted of an outing at the scenic East Lake Golf Club, of "Bobby" Jones fame, on Wednesday afternoon. Here a luncheon was served, followed by golf and bridge tournament. An old-fashioned southern barbecue was held on the lake shore at 6:30 p.m., after which the vistors were entertained with a "battle royal" among negro boys. Other entertainment was held in the club house, which terminated this splendid program.

The ladies were entertained at luncheons on Monday and Tuesday, with bus trips on various days to points of interest. Visits were made to Stone Mountain Memorial, Grant Park Cyclorama, Emory University, with stops for luncheon at the Brookhaven and the Druid Hills golf clubs. A group of 27 Atlanta ladies, all wives of electrical contractors, served as hostesses for the visiting ladies. Mrs. J. M. Clayton headed the ladies' group in cooperation with Herman Fulton, chairman of the ladies' entertainment committee. A bouquet of flowers was placed in the hotel room of each lady visitor upon arrival, also a gardenia corsage was provided for these ladies and additional invited hostesses who attended the Monday evening dance. Handsome bags were presented the ladies as favors at the Tuesday evening banquet.

J. M. Clayton, of the J. M. Clayton Company, was general chairman of the Atlanta convention committee under whom the following committees served:

Reception Committee: R. M. Walker, Chairman.

Finance Committee: Jack Fulton, Chairman.

Invitation Committee: A. M. Hitt, Chairman.

Contact Committee: Chas. Whitehead, Chairman.

Ladies' Entertainment Committee: Herman Fulton, Chairman.

Sergeant-at-Arms: R. H. Cleveland.

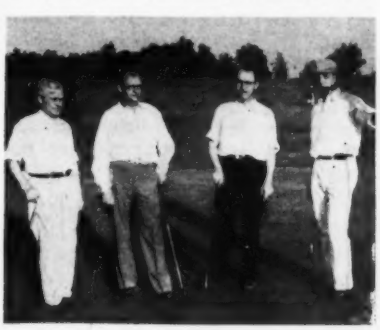
E. A. Thornwell, R. A. Clark, Atlanta, Ga., A. C. Prang, Bridgeport, Conn., J. O. Wetherbie, New York, N. Y.

Ernest T. Lord, Atlanta, Ga., C. C. Cadwallader, Detroit, Mich., Fred G. Kraut, New York, N. Y., and Frank Adam, St. Louis, Mo.

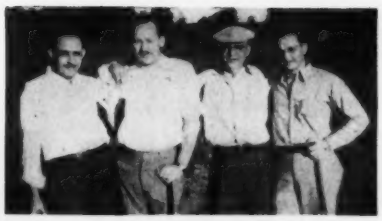
L. D. Kennedy, Brooklyn, N. Y.; W. T. McAuley, Kansas City, Mo.; Ralph H. Bouligny, Charlotte, N. C.; and M. D. Gruber, New York, N. Y.

J. Norman Pierce, Chicago, Ill., Harold B. McGaughey, Atlanta, Ga., Wm. L. Marks, Chicago, Ill., and F. D. Wheeler, Plainville, Conn.

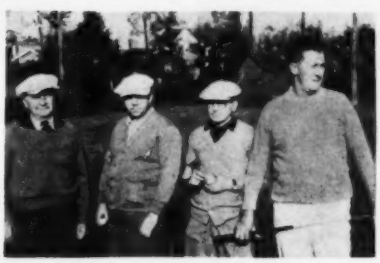
T. J. Fleischer, H. B. Frazer, Philadelphia, Pa., F. D. Gibson, Pittsburgh, Pa., J. M. Richardson, Roanoke, Va.



H. W. Turner, L. E. Lewis, Fred Stockton, Atlanta, Ga., and Samuel G. Hibben, Bloomfield, N. J.



H. Allen, Detroit, Mich., M. W. Parmlee, New York, N. Y., C. L. Hull, Detroit, Mich., and Robert W. Collins, Atlanta, Ga.



Vice-president Louis Kalischer, Brooklyn, N. Y. President Earl N. Peak, Marshalltown, Ia.; A. Lincoln Bush and S. J. O'Brien of New York, N. Y.

What the N.E.C.A. Does for Members*

by President Earl N. Peak

EARL N. PEAK
President, N.E.C.A.

ONE OF the questions commonly asked by electrical contractors who are not members of the National Electrical Contractors Association is, "Why should I belong to the N.E.C.A.?" Another is, "What does the N.E.C.A. do for me and my business?"

Since the last convention, the officers and executive committee members have endeavored to bring to the membership of the Association, information and constructive plans that would assist each contractor to improve his business, as well as benefit the local, state and national organizations. In this program they have received the cooperation of various individuals, of chapters, and of state organizations, as well as that of the national associations of other branches of the electrical industry.

Some of the information is as follows:

1. On the Social Security Act, the National Association prepared two special tax bulletins: One was an Analysis of the Social Security Act as it affected electrical contractors; and the other was an Analysis of State Unemployment Insurance Acts under the Federal Social Security Act. Both bulletins contained the information necessary in order to comply with the law.

2. The National Association has printed and distributed during the past year many hundreds of copies of a "Voluntary Agreement of Fair Competition" which is founded upon the principle that the interests of the public and of the industry can best be served by the elimination of unfair and destructive business practices. The National Association recommends it to all local groups who are desirous of developing fairer competition, fair and reasonable profits and a higher standard of services to the public.

3. A Bidding Practice Plan was prepared and distributed to the membership, which gives to the subcontractor the same consideration the general contractor expects to receive.

4. The NECA Simplified Business Record System, complete in every detail, and so simple that a one-man shop can keep a set of these books, by devoting an hour's time to it daily, is given to every NECA member who asks for it, without additional cost over his yearly dues. The system can be recommended to any electrical contractor, as a complete system which will meet the needs of any ordinary electrical contracting business.

5. The N.E.C.A. has assisted the R.E.A. with information on different types of construction, competitive bidding plans, and qualification of contractors desiring to bid on installations, inside wiring and outside construction. It has furnished names of contractors in various sections of the country. By means of this cooperation, it has been possible to keep members who are interested in this program in close contact with the R.E.A. program. Conferences have been held with the Electric Farm and Home Administration on appliances and apparatus, as well as house wiring plans and bidding practices.

6. The new NECA Manual of Labor Units, which is kept continuously up to date by a monthly service of additional sheets on the fifteenth of each month, brings to the membership a valuable cost data service.

7. During the past few months, our new monthly publication known as "The Qualified Electrical Contractor" has reached the membership. It will be published for the purpose of encouraging the adoption of various plans that are used successfully in different places.

8. During the past year substantial progress has been made by our Committee on Distribution, in obtaining a better recognition of the functions of the electrical contractors and the need for a more adequate compensation for their services to the industry. The development of sound trade relationships between the four branches of our industry is one of the most important fields of service of our National Association.

9. An industry coordination movement, wherein the four major national organizations are working together to build new business for the electrical industry was started by the N.E.C.A. in December, 1935.

10. The pledge of cooperation, which sets out the requirements and functions of an electrical contractor, received an almost unanimous vote in favor of the pledge being made a part of the application for and a requirement of membership in the N.E.C.A. Therefore, the entire membership is composed of men who believe in the principles set out in the pledge, and are accordingly known as Qualified Contractors.

I could name many more ways in which we have assisted our members. We have helped in obtaining work for them; we have furnished information to assist in straightening out local problems; we have helped with local and state ordinances, laws, franchises, etc.; obtained job information for individuals, to say nothing of the assistance given on local, state, district and national organization.

All of these things are but evidence of the fundamental purpose for which the N.E.C.A. is operated, and that is to strive to make the electrical contracting business a profitable one for each member.

Qualified Contractors

In the past, we have been known as electrical contractors. No distinction was made between the good

* Abstract of address before the 34th Annual Convention, N.E.C.A., Atlanta, Ga., October 12–14.

and the careless contractor; between the man who is willing to do his part in adding something constructive to the industry, and the fellow whose one desire was to get all he could and give back nothing. Today, there is a difference. We still have electrical contractors, but we also have "qualified electrical contractors", men who live up to the requirements of the NECA Pledge of Cooperation, and who acknowledge and carry out the functions outlined by the N.E.C.A. as definite responsibilties, in order to justify their position in the industry.

This pledge and these functions are not something which it will be impossible to live up to; on the contrary, they are what the ethical business man in any line of business should do as a matter of course. The man who carries out this program will find that the entire industry will have confidence in him.

Thus the National Association is trying to set up a program that will cause the electrical manufacturers, the wholesalers and utilities of the United States and Canada to have confidence in the membership of the N.E.C.A. so all may work together in building more business for everyone engaged in the industry. After this business-building program is under way, it will then be our concern to see that it is kept flowing through the proper channels of distribution.

The Electrical Industry Promotion Committee is now in a position to assist local coordinating committees to start their local programs. Some localities already have their committees; other are organizing. I feel that every member of the N.E.C.A. should make it his business to see that a committee is formed in his own community, and start the program himself, if necessary.

Our greatest problem is the electrical contractor himself. I have no fear of any branch of the electrical industry taking the business which rightfully belongs to the contractor, or of any other industry doing so, provided we can but get the electrical contractor to realize the importance of performing his duty in his own home community, and that it is his responsibility and not that of his competitor, his state organization, his district committeman or the N.E.C.A.

It is my purpose to do everything I can for the communities or local groups which are willing to do something for themselves, but I do not favor spending any time or money where everyone is too busy to work on a business building program in his locality. The problem of the National Association is to get the local organizations to realize their responsibilty, and carry out the program made possible through the National.

There has been a gradual drain on the resources of our treasury for the past eight years and if this is to continue, the National Association will have a serious situation to face in about three years. Your officers and executive committeeman have realized this and have set up a program to build up local membership. Results so far have been encouraging.

Building Economic Trade Relations*

by Ralph M. Walker

Chairman NECA Distribution Committee, Atlanta, Georgia

MANUFACTURERS generally agree that the marketing of their products can be done much more economically through jobbers and retailers than by trying to sell direct to the consumers themselves. Most of these manufacturers feel that the differential set up for the jobber is much less costly than an attempt to cover the country with sales forces of their own. Discussions with representative jobbers have also disclosed that they would be much more happy and prosperous if it were possible for them to confine their functions to the stocking of manufacturers' products and the sale of them to retailers or contractors, rather than attempting to contact each individual consumer themselves. Unfortunately, we find certain manufacturers and certain jobbers inclined to grab off easy, large quantity orders direct from the consumer, leaving the salesman, as represented by the contractor or dealer, to handle the smaller and more difficult orders.

That this condition exists is the fault largely of the contractor. He has been in a position neither to assert his rights nor to guarantee his performance.

Must Prove Qualifications

The problem before us today is the same problem that we had last year: of proving to the manufacturers and jobbers that the best marketing facilities for their products are offered through the contracting branch of the industry. But in the end, only those contractors who prove themselves to have the attributes of a qualified contractor should benefit from any set-up in the industry. In other words, if a salesman proves to be a "flop" we discharge him, and there is no reason why the manufacturer or jobber should recognize that a contractor is entitled to differentials unless he proves himself worthy of them.

Now, it has generally been agreed that there is a very large group of qualified contractors and that there should be a definite cooperation between these contractors and the manufacturers and jobbers who desire to maintain an ethical business practice. And it is generally agreed too, that if this better element in the three branches were to get together and cooperate, that the unscrupulous element in all the branches could well be ignored.

In outlining the proposed plan of distribution at the last convention, I stated, and I still adhere to this position, that our first problem is to organize the contractors locally, to have them get acquainted with each other, to begin doing the things that can be done in a local organization to make business profitable, even though the general set-up in the industry is not what is desired. A plan has been worked out for local organization which has been offered to the industry both by mail and by word of mouth to a very large extent, and yet the response to this proposition has been pitiful.

The need for local organizations

* Abstract of paper presented at Thirty-fourth Annual Convention, N.E.C.A., Atlanta, Ga., October 12–14.

is strikingly illustrated by the fact that in every locality that I have visited where a local organization is operating under almost any kind of a plan, the contractors are more prosperous, they have a better feeling toward each other, they are using such differentials as are available for a profit, and their relations with the central stations, jobbers, and manufacturers are generally much better than in those localities which have no local organization.

In almost every case where there is no local organization, we find the contractors at daggers' points with each other and with the other branches of the industry also, and there can never be any remedy for our present situation while these conditions exist.

No matter how small the community (if there are only two or three contractors in a community) such an organization should exist, and in the larger communities where there are many contractors there should probably be a number of local groups working together, but finally coordinating their efforts through a district or state organization, or both.

There is the opportunity offered if the local group is working together, of meeting with other local groups of jobbers, manufacturers' representatives, and the power company to discuss and work out to mutual advantage the local problems arising. A great deal can be done in this respect, although the larger problems cannot be worked out except nationally. I believe that the national problem must be settled:

Local Organization

First. By local organizations getting together and settling as many of their local problems as they can amongst themselves and with the other groups in the industry.

Second. That these local groups must be formed into district or state groups to handle problems of a general local nature, which perhaps cannot be handled by a local group. For instance, jobbers operating in a whole state or a district may have a good policy in the locality where there is a local organization, and yet may be ignoring that policy entirely in other similar localities where there is no such group, or where the group is not strong enough or influential enough to overcome inimical policies. Also, there is the problem of dealing with the power companies, many of them covering large areas. In many instances the relations between contractors and the power company are left to local managers, who do not understand or do not wish to understand the general problem. In these cases, the officers of a state or district group can usually go to the higher officials of the power company and have no difficulty in straightening out policies that are not conducive to cooperation.

I don't think anyone need expect a millennium. We can never hope to secure the cooperation of the entire industry, but if we can secure for the decent element in the contracting branch of the industry the cooperation of the decent elements in the manufacturing and jobbing branches, and the cooperation of the central stations, we will have done enough.

Universal membership is not necessary. We can handle our problem with only that part of the industry that can come under the heading of "qualified". For instance, 30 per cent of the contractors control 85 per cent of the total business, and there is no reason why this 30 per cent should not play together, ignoring the others, about which they can do nothing anyway.

A 10-Plank Platform

for Distribution Through the Contractor*

by Joseph C. Fitts

Secretary, Heating, Piping and Air Conditioning Contractors National Association

** The elements of the problem of distribution of constructing materials are apparently the same in the plumbing trades as in the electrical. The platform which Mr. Fitts presented to the N.E.C.A. convention at Atlanta last month under the title "The Contractors' Viewpoint of Industry Distribution Problems" is a clear expression of the fundamentals to be considered. Editor.*

1. That the contractor recognizes his responsibility for the solution of the sales problems which affect his operations, and further recognizes that in some respects his problems overlap those of the manufacturer and wholesaler. In such cases he proposes joint consideration and joint action on the part of the entire industry.

2. That the dual functions of the contractor as an installer and as a retailer be recognized, and that the sales program be so developed as to take full advantage of the contractor's long record of making installations which operate properly.

3. That the contractor is the logical retail outlet for the products of his industry and that as such retail outlet he recognizes his responsibility for sales. The contractor considers it his function to create a demand for the products of the industry by salesmanship, contact with the consumers, and market development, and pledges his efforts, both individually and through his association, to this end, and for these services he is entitled to an adequate differential to cover the costs of creating sales.

4. That the contractor should sell product as he always has, but that his approach to his prospect should be through the motives of comfort, leisure, convenience and recreation.

5. That organized groups of contractors, collectively, should sell these motives, comfort, leisure, convenience and recreation and the functions of the apparatus to be installed.

6. That the Qualified Contractor program be used by organized groups to lessen sales resistance.

7. That the National Association take the initiative in devising ways and means of establishing research facilities to determine for the industry, through independent and unbiased study, what the public wants and how the public wants to buy it.

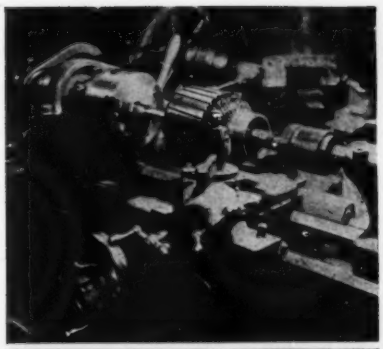
8. That the National Association recognizes as its responsibility the promotion of active interest in creative selling on the part of its contractor members, and in carrying out that responsibility will orient its activities toward the development of a practical trade promotion program.

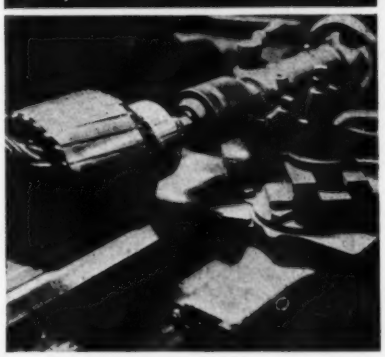
9. That the local associations recognize their responsibility in aiding members to create sales through a program designed to assist the member in solving his sales programs.

10. That the contractor pledges himself during the coming year to review the market possibilities of his trade area and to make a consistent effort to increase his sales volume, not alone in the new building field but also in the modernization field, by the addition of modern sales methods in connection with the bidding process.

Cutting Small Motor Repair Finishing Costs

FINISHING the small motor repair job presents opportunities for effecting savings in the time consumed for turning commutators, undercutting, and for making final performance tests. These operations are done speedily and with precision in the small motor service department of the S. J. O'Brien Sales Corp. of New York, N. Y. About forty zone specialists in refrigerator service work are kept supplied by this department with reconditioned motors. Each repair operation is kept under careful supervision to assure uniform and trouble-free production at reasonable cost. The finishing-up methods are presented as the outgrowth of this company's experience in handling a large volume of small motor work as a separate activity from its heavier motor repairs.

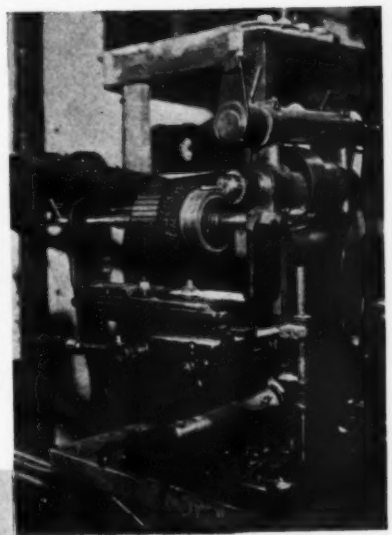


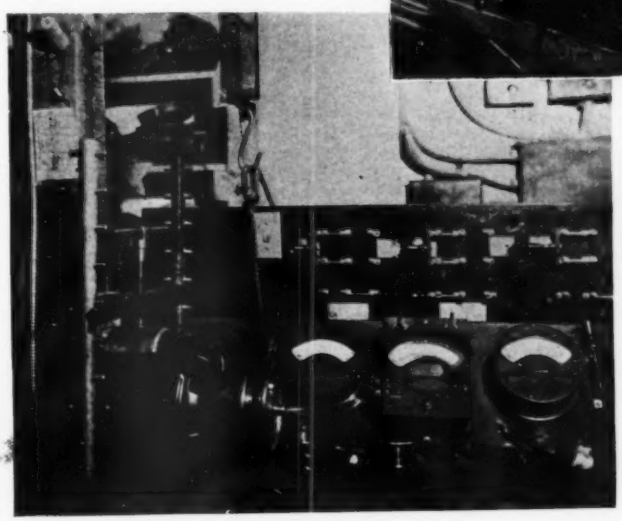


Upper. This 9-in. swing lathe is equipped with a universal adjustable-finger tail stock with which it is possible to chuck centerless-shaft armatures in an average time of 40 seconds. Quick make-up and alignment of armatures is thus accomplished regardless of whether the armature shaft has a tail-stock center. Simplified chucking and quick precision alignment reduces the job to turning the armature. This assures uniform but effortless workmanship for a vital operation, because the lathe was chosen for its adaptability to such small work, keeping in mind handy motor control, easy shifting of belts on its 3-cone pulleys, and accurate hand feeds.

Lower. A close-up of the adjustable tail stock attachment for centerless armature shafts. Three expanding bronze fingers engage the shaft and are kept oiled to provide a universal tail-stock bearing. The universal lathe chuck rotates the armature, while adjustment collars on the tail-stock permit the bearing fingers being taken up by hand as desired.

Below. Reconditioned motors are set up in 2 minutes for their final tests. The test platform consists of a metal base block placed on the bench between two pegged pipe standards. One standard is hinged to fold outward and downward alongside the bench while a motor is set up or removed. A channel-iron cross plate, grooved at its ends, fits into the two pipes at any set of pegs and has a steel motor clamping shoe and screw adjustment, thus accommodating a wide range of motor sizes. A swinging scale bracket is provided over the motor clamping rack. Load tests are made with a snubbing rope attached to the scale and wrapped around a flanged steel pulley. The tester has a floor treadle switch for controlling the motor. Before him on a sloped bench board are an ammeter, a 2-range KW meter, and an 0/400-scale wattmeter.





Above. Commutator undercutting has been standardized by rebuilding a small milling machine to provide for effortless mounting and rotation of the armature. Here commutators for armatures up to 1½-hp. are precision-finished in 10 to 15 minutes, where hand operations would run as high as 2 hours. Saws are quickly interchangeable, being mounted on a screw-headed spindle that is chucked in the arbor. A special armature mounting bracket was attached to the original bed plate. The commutator is, therefore, made to travel under the saw for each slot length. An end-screw was made for shaft take-up that allows the operator to rotate the armature from slot to slot against this take-up friction. The bed plate includes a standard geared travel-feed lever, commutator centering adjustment and a bed-elevating lever. While undercutting, the operator uses the travel-feed lever (middle left) for feeding and retracting the commutator for the length of a slot. The armature is then turned to the next slot and the operation is repeated.

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1. An example of unsightly open feeder spans which served the many buildings until new underground feeders were ready to be cut over.

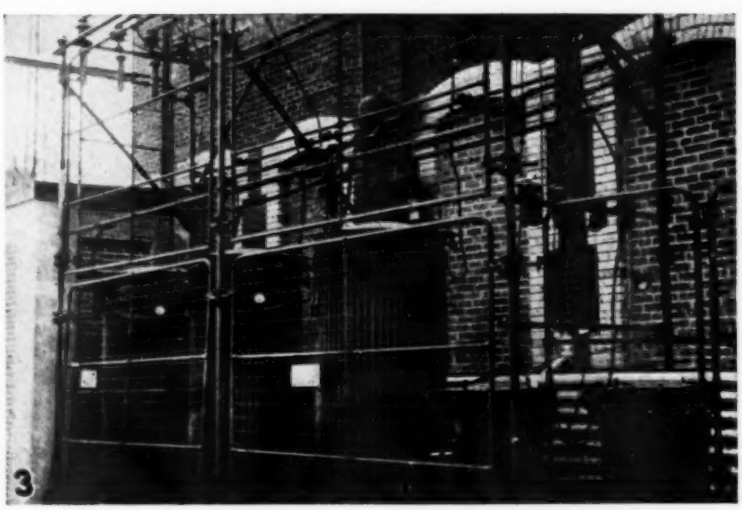
2. An "after" view of the scene shown in No. 1 with the overhead system removed. Here six 3½-in. exposed conduits were installed from a manhole on the outside of the building to pick up the former overhead services. Three spare conduits were stubbed up from the concrete manhole cover and capped for future needs. Similar spare provisions were made at each of the six manholes that were provided in the system.

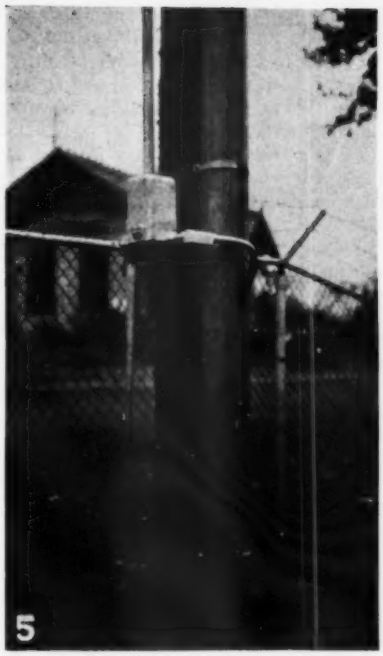
MODERNIZING Outdoor Feeders *for* ADEQUACY

PROFITING by its previous experiences in the cost of maintaining and reenforcing a maze of old open spans and steel towers, a modernization plan was followed at a Newark, N. J., paint factory which is flexible and which provides for any likely expansion of load in eleven principal buildings that form this factory group. Underground ducts were installed from a pole at the property line through a primary switch house, then for about 400 ft. to the enlarged transformer station. At this point, a generously planned system of active and spare secondary feeder ducts radiate from the main

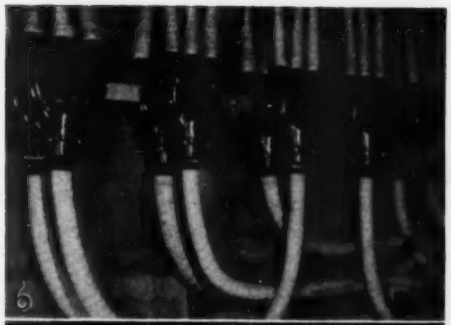
3. A "before" view of three 300-kva. power transformers and two 50-kva. lighting transformers, with their open wiring connections for the primary and secondary bus.

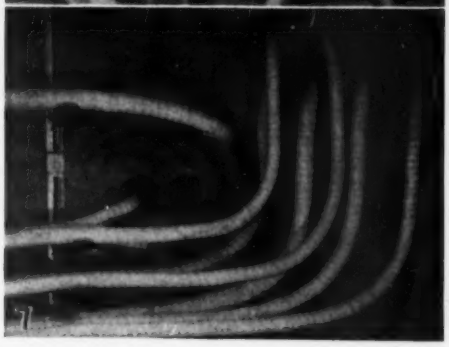
4. Re-wiring the old transformers included the installation of an additional 75-kva. lighting transformer. New primary and secondary busses were installed in conduit to cut down exposure to the elements and to provide greater safety along a busy factory street. The exposed 3½-in. conduits in the foreground lead from the main switchboard to the first manhole of the underground distribution system. There are fifteen spares stubbed up and capped for future use, which lead to empty underground ducts.





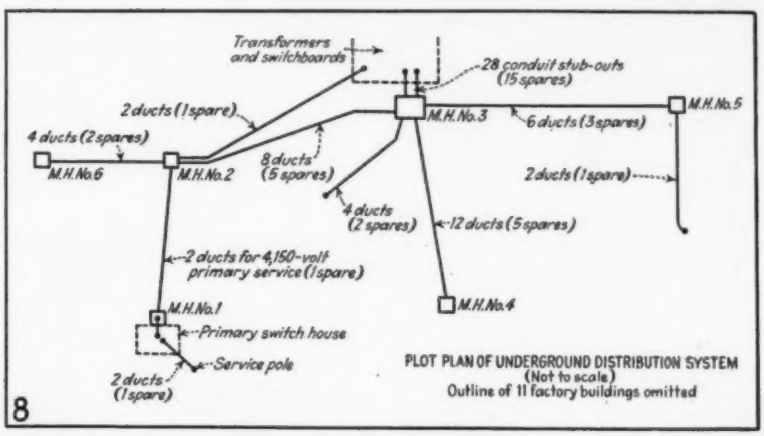
5. The 4,150-volt main service conductors were placed underground from the service disconnect pole at the property line. Here pole type outdoor disconnects are manually operable by an extension lever near the bottom of the pole. An electrical interlock prevents the line being opened until after the main oil circuit breaker is first opened. From this pole the primary service extends first to a separate main switch house nearby, thence a distance of 400 ft. underground to three separate oil breakers controlling the two power banks and the lighting bank. From these sub-main breakers, the conductors serving each group of transformers are enclosed in exposed conduit.

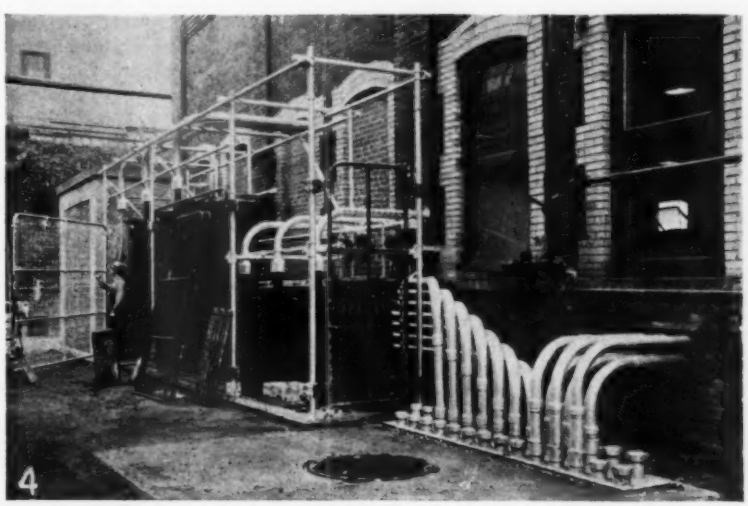




switchboard, through six manholes, into the various buildings.

Having recently added more than 600 hp. in motor load because of the construction of a new varnish manufacturing building and in connection with the introduction of new machinery in other factory units, it was necessary to add three 333-kva. power transformers and one 75-kva. lighting transformer to the existing three 300-kva. power and two 50-kva. lighting transformers. Feeder inadequacy became a problem immediately on the 4150-volt mains and on the 550-volt, 3-phase power and 110/220-volt lighting feeder systems.





6. The various 3-conductor lead sheathed underground cables were spliced within potheads at the various manholes wherever single-conductor, rubber-covered cables were extended into buildings. The exposed lengths of all conductors were asbestos-wrapped for added flash protection.

7. Adequate space was allowed to permit adding other cables in the spare ducts with minimum obstruction. All ducts were standardized at 4-in. sizes.

8. Future cables may be extended or existing cables re-arranged to suit changes in demand at the eleven buildings in this factory because of the spare ducts that were provided. Even the 400-ft. main primary feeder duct is parallel with a spare 4-in. duct for a future multiple feeder, should it be needed.

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Instead of attempting to patch up and make additions to the existing feeder equipment, a clean sweep was made from the point of service to the various buildings.

Certain major factors were responsible for completely abandoning the obsolete overhead feeder system in favor of underground feeders:

1. Paint manufacturing involves fire and explosion hazards. Therefore, lightning and flash hazards were considerably reduced by installing the underground feeder system.
2. The cost to maintain the old system, because of its inadequacy and unsafe patched-up condition, did not justify expensive alterations.
3. Future changes in plant load required a layout that could be easily and safely altered or added to at reasonable cost and without interference to operations.
4. Safety measures resulted from the new layout, such as: The removal of wires that might interfere with firemen; removal of high voltage open conductors from the factory yard; better shielding of lighting conductors from becoming accidentally charged with 550-volt power current; future safety in altering heavy feeders at manholes rather than on crowded steel towers.

In making the foregoing installation, the Edward J. White Company of Newark also re-wired and enlarged the existing transformer station for greater safety, sectionalized the main power switchboard for receiving current from two transformer banks, and replaced the old lighting feeder distribution switches with new panelboards of adequate design. This re-vamped feeder system represents a $15,000 investment in adequacy which will pay worthwhile dividends for many years in preventing plant interruptions, in providing greater safety, and in lessening the cost of making future changes.

Shunting Contacts by Condensers

by R. E. Marbury

Engineering Division, Westinghouse Electric & Manufacturing Co.

AN INQUIRY was received recently from an electrical contractor concerning trouble experienced from pitted contacts on a timer which operated a reversing controller for a 5-hp. 230-volt d.c. motor. The inquiry requested information to cover the introduction of a condenser across the contacts.

Because of the many circuit variables involved when shunting contacts with a capacitor, it is practically impossible to recommend the right size capacitor without knowing complete details of the operating cycle and associated circuit. Often, the simplest solution is a cut and try process.

Assuming, for example, a timer which consists of a motor operated contact type switch that controls a magnetic contactor, the conditions are somewhat as follows: The contacts open and close a highly inductive circuit, therefore when the contacts break, an arc is drawn due to the fundamental characteristics of this inductive circuit tending to maintain constant current. The voltage across the contacts rises to a very high value, depending on the amount of magnetic energy in the circuit.

When a capacitor is shunted across contacts in a circuit of this kind, the voltage can rise only at a rate limited by the energy required to charge the capacitor. If the rate of separation of contacts is very rapid, the arc will be suppressed, because for any time (T) after the gap opens the voltage related to the separation can be made such as to produce a small arc. With extremely rapidly separating contacts, the arc may be almost completely eliminated because of the separation rate exceeding the charging rate.

If, on the other hand, the rate of separation is very small, such as is the case with the motor operated timer referred to, a very large capacitor would be required to materially improve the arc on the break. This immediately introduces another difficulty in that the discharge energy from such a large capacitor, on the reclose of the contacts will be more serious than the original arc on the break. It is, therefore, necessary to make a compromise on the value of the capacitor by putting in one not too large as to cause percussive welding action, and not too small as to be of no value in suppressing the arc at the break.

It is quite likely that a 0.1 m.f.d. capacitor would be a fair compromise in a case of this kind but, due to the slowly separating contact, it is doubtful as to whether this would be of material value. It is not our regular practice to use capacitors across contacts in a timer of this type.

If a 0.1 m.f.d. capacitor is used, it must have sufficient insulation to withstand the high voltage that will develop across it due to the inductance of the contactor operating coil, which no doubt in this case will reach 2000 or 3000 volts. A capacitor, therefore, which is capable of running with at least 3000 volts d.c. should be used, or one which has had a breakdown test of at least 5000 volts. However, this all depends on the contactor coil and its inductance and the amount of current.

As for the type of capacitor, the wax impregnated aluminum foil type is to be preferred as it is cheap and easy to mount. The nature of the service would not require a high quality oil capacitor or a mica capacitor, and inasmuch as the capacity requirements are very small—such as 0.1 to ¼ m.f.d., there would be no occasion to use an electrolytic type since these are inherently low voltage devices where very large capacity is required such as 50 to 500 m.f.d.

Work-in-Progress Rust Prevention

Steel cabinets, racks and equipment frames that are erected in damp portions of new buildings often become quite rusty before they are given a protective coat of paint. This is largely because the application of a prime coat would interfere with work in progress until the paint would become dry. On work of this type that is installed by Morris Hunter of Richmond, Va., a quick-drying prime coat, somewhat similar to "red lead" is used. All exposed metal is given this priming toward the end of one day, and is found to be dry when work is resumed on the next day. By priming all newly erected steel soon after it is installed, there is no trouble later on from rusty surfaces which cannot be given final paintings without being cleaned of scale.

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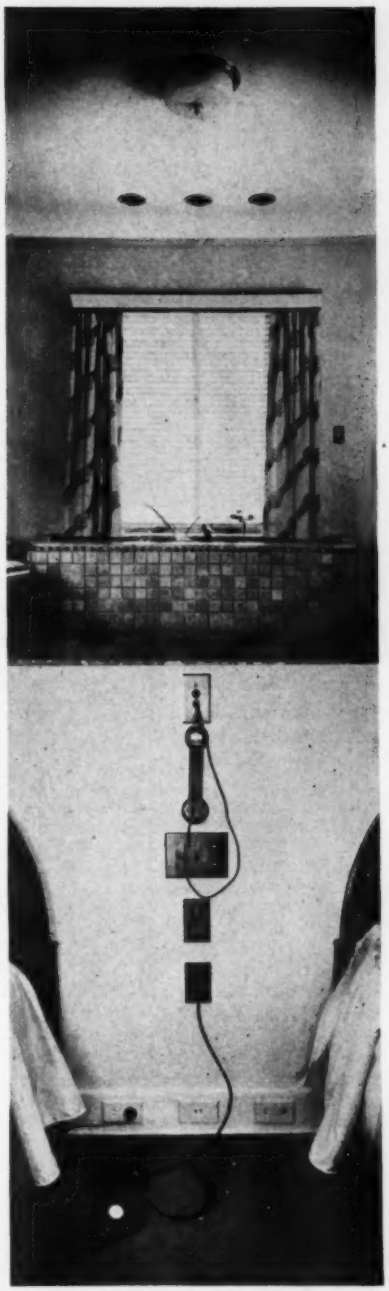
HOUSE WIRING PLANNED FOR PERMANENCE

AN EXAMPLE of how much wiring convenience can be sold in a medium-sized owner-built house is reflected in the recently completed L. C. Heine residence near Omaha, Neb. This eight room home which was built to live in and not for exhibition has a total of 324 miscellaneous outlets employing 44 circuits, as well as many other outlets for signalling and communication devices. The layout was made by Henry Hamann, local electrical contractor, to provide a wiring system that would give the owner permanent convenience and which would require no future additions in any part of the structure.

The feature of the layout is the switching system which provides 110 control points, which includes 48 single-pole, 34 three-way, 7 four-way, 9 door type, 8 remote control, 2 time-delay, and 3 special underground magnetic switches. There are 17 tell-tale pilot lights that operate with one or more of the foregoing controls. As an example of switching convenience, the reception hall ceiling fixture is controlled from five locations at various entrances to this area. Of 82 plug-in outlets for portables, clocks, fans, paintings and appliances, about 35 are wholly or partially controlled from one or more points. Some outlets are the triple type with the center receptacle switched, while the majority are the "half-hot" duplex type. A special 4-circuit panelboard section is magnetically master-switched to provide remote control in the master bedroom, front vestibule and also from within the owner's automobile. This magnetic master switch turns on all garage and exterior lighting, and the first floor and basement ceiling lights.



Above. The master bedroom contains thirty-one 110-volt outlets, two radio outlets and several signal devices. The order of between-bed outlets, beginning at the top: Inter-phone to rear entry and garage; 3-gang plate containing switch for "stumble lights," pilot and "on-off" buttons for master switch control; two pearl pushes—maid's room and chime; public telephone jack outlet; two duplex plug-in outlets with radio outlet located between them. (Telephone and lamp stand was removed to obtain this photograph.)

Top. To accentuate the natural colors of plants and flowers in this tile flower box, the room ceiling has been provided with three recessed spot lights equipped with spill-rings and color frames.

The main stair hall ceiling outlet is controlled from five points of entry with two 3-way and three 4-way switches. An 8-gang pilot lamp in the upper background indicates the use of lights in the recreation room, furnace and laundry rooms, and several outside lights.

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Among the twenty-four outlets provided in the kitchen were four under-cabinet bracket lights which flood the tiled work spaces. These are controlled, like the main ceiling outlet, from their own set of 3-way switches at each entrance to the kitchen. There are seven plug-in outlets for appliances, clock, fan; also a radio outlet, and outlets for the range, dishwasher and exhaust fan.

Schedule of outlets by rooms	Light outlets			Receptacle outlets									Switch outlets					
	Ceiling	Wall	Outdoor	Floor	Duplex	Triplex	Picture	Clock	Fan	Pilot lamp	Outdoor	Radio	Single pole	3-way	4-way	Door	Time delay	Remote control
First floor																		
Front entry	1		2										2					
Vestibule	1				1									2				
Reception hall	1	2			1					8			1	2	3			
Living room	2	6		2	2	8	2					1	3	4			1	
Dining room	1	5			4		2					1	2	2				
Sun room	4					4						1	3				1	
Breakfast room	1				3			1	1			1	1	2				
Kitchen	1	5			4			1	1	1		1	3	4				1
Side porch	1				3							1	1					
Rear entry	1													2				2
Lavatory	1				1								1					
Two closets	2															2		
Second floor																		
Stair landing		1			1									2				
Hall	1				1									2	2			
Master bed room	1	3			10					1		2	4	3				2
Bed room No. 2	1	1			4							1	2					
Bed room No. 3	1	1			4							1	2					
Sewing room	1				4							1	1					
Master bath		4			1								2					
Bath No. 2	1	2			1								2					
Five closets	5															5		
Attic	1												1					
Basement																		
Stairs landing		3			1					1				2				
Recreation room	2	5			7		1		2	1		1	8	1				1
Furnace room	3				1								1					
Laundry	1				1					1			1					
Basement toilet	1												1					
Vegetable room	1															1		
Storage	1															1		
Outdoor																		
Gate posts			1										1					
House number			1										1					
Front lawn											2		2					
Garden			2											2				
Walks-drive way			3							2				2	1			3
Garage	5	1			1					2			2	2	1			2
	43	39	9	2	56	12	5	2	4	17	2	12	48	34	7	9	2	11

The automobile control is obtained by means of a dash-controlled magnet on the car that actuates a switch which is buried in the main driveway. Two similar underground switches in the driveway are for controlling two motor-operated garage doors. Additional remote controls for these doors are also provided at two places in the house.

Signalling facilities include an eight-drop electric reset annunciator. There is a four-tone chime which can be operated from five locations on all tones, a single-tone circuit from the dining room floor tread, and a remote keyboard in the living room.

There are twelve radio outlets located in the various rooms and on porches. Silencing controls are provided with time-delay switches at telephone outlets in the reception hall and in the living room. These switches operate relays that short-circuit the antenna and ground terminals at the radio outlets in

Additional Special Outlets

Range — hot water heater — bath room heaters; basement refrigeration unit. Oil furnace and automatic control with provisions for summer cooling. Dishwasher, kitchen exhaust fan, recreation — master bedroom exhaust fan, garage door motors, motor-driven dimmers for recreation room controlling five 3-color wall urns.

Master switch control for principal lights from driveway, master bedroom and front vestibule. Garage door motors controlled from driveway. Four-tube chime, 8 drop annunciator and 8 button stations. Keyboard chime-playing control in living room. Floor tread in dining room sounds one chime tone. Time delay switches in sun room and living room for radio silencing.

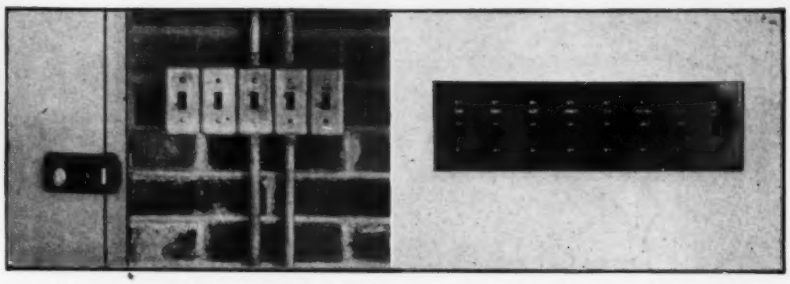
Private inter-phones in master bedroom, rear vestibule and garage. Public telephones in three rooms with plug-in jacks.

Burglar alarm system with concealed treads at stragetic points inside the house. Alarm operates relay to turn on master lighting switch. Three secret alarm turn-off buttons in house.

At the rear vestibule is a wall-type inter-phone, and a single-gang plate with controls for two garage door motors. The 7-gang switch plate contains three sets of 3-ways and pilots for yard lights, driveway lights, and side-porch lanterns, the seventh device being a 3-way control for the vestibule ceiling outlet.

An underground feeder of three No. 1 lead covered wires was run from the garage to the 44-circuit main lighting panelboard, which also contains the range control at the bottom. Low-voltage equipment for inter-phones, burglar alarms, chimes, etc., are housed in one metal cabinet beside this main panelboard.

these rooms. When either of these telephones are to be used, the time-delay silencing switches may be flipped on and the program remains subdued for a given time-cycle, after which time the normal program is automatically restored. Several of the public telephone outlets are provided with jacks for use with a portable set.



Adequate switching provisions extend even to the detached 2-car garage. This 5-gang group has two single-pole switches for ceiling outlets and three 3-ways for groups of outdoor lighting. The 3-ways operate in conjunction with similar controls located in several places in the residence. There are also six other outlets and two door motor switches in the garage.

Switch groups, like this 8-gang control in the recreation room are statuary bronze with each switch control engraved above the lever

Motor Terminal Box Holes Too Large

Editor,
ELECTRICAL CONTRACTING:

An Open Letter to Motor and Equipment Manufacturers.

I believe I express the views of practically all electrical contractors and motor installers when I say that it is beyond my understanding why motor and equipment manufacturers equip their product with terminal outlet boxes having holes or knockouts for conduit fittings several sizes larger than required for the proper connection of the maximum size conductors and conduit.

For instance, we have had ¾ hp. 220/440 volt motors with 1-in. conduit holes, 5 hp. with 1¼-in. and 1½-in. holes, and 10 hp. and 20 hp. motors with 2-in. holes.

All oversize holes require the use of one or more sets of reducing washers to reduce for the proper size conduit connector.

At best, it is but a make shift and is most uncertain in maintaining a proper bond to ground, especially where vibration prevails or a motor is mounted on a floating base. A far better method would be to equip all equipment with terminal boxes having minimum size holes or even with ½-in. holes, so that the installer may enlarge same if necessary.

E. T. EASTMAN

Saginaw, Mich.

Reports on Mechanic Training

Editor,
ELECTRICAL CONTRACTING:

In your survey of skilled labor, October number, you say that nothing is being done to build up the number of apprentices in this city [Richmond, Va.]. I wish to take issue with you upon this point, as there are two classes being conducted at the John Marshall High School upon this subject in addition to two courses at the Virginia Mechanics Institute and an Underwriters code class being conducted by the writer assisted by one of the city electrical inspectors.

We have one apprentice to each journeyman mechanic in our union shops while our non-union competitors have practically three helpers to each journeyman. I have about three hundred and fifty young men registered with me wanting to learn the electrical trade; but if it were possible to place all these boys and they completed their apprenticeship in a period of four years, there would not be enough work in and about Richmond to supply them with two hours work per day.

I can truthfully say that we are adequately taking care of all work in this city. However, we believe it unwise to turn out mechanics in excess of the ability of the industry to absorb them, as it tends to not only lower the standard of wage scales, but unemployed mechanics will enter the contracting field to such an extent that the business becomes demoralized and neither contractors nor mechanics are able to make a decent living out of a profession or trade that should permit of a decent standard of living.

H. M. MONAHAN,
Business manager for
Local No. 666, I.B.E.W.,
Richmond, Va.

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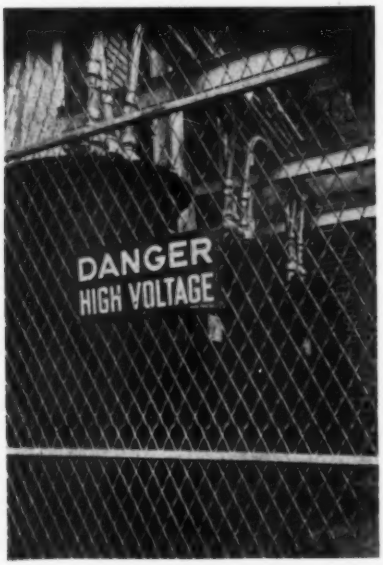
Construction . . Methods . . . .

Fully Enclosed Transformer Connections

The use of brass conduit and fittings to enclose single-conductor



primary conductors, and rigid iron conduit to enclose two or more secondary conductors provided a fully enclosed wiring method for a set of 333-kva., 4150/550-volt outdoor transformers that were recently installed by the Edward J. White Company, Newark, N. J. Methods for terminating the enclosed leads were employed that are claimed to provide easy means of cutting out any transformer, and its removal from the enclosure. This arrangement of metal-protected conductors eliminated the use of insulators, provides a permanent protection from weather, and assures a grounded metal raceway system for the primary leads that is free from induced currents.

Through the use of brass reducing fittings and short lengths of brass flexible conduit at the primary terminals, a flexible enclosure was developed which telescopes the lead-sheathed single conductors. The sheath of each conductor terminates in a wiped joint at removable brass thimbles in the transformer case above the primary terminals. Each run of 4-in. rigid iron conduit encloses the secondary leads from one transformer. A special sheet steel hood was designed to telescope the secondary terminal bushings.

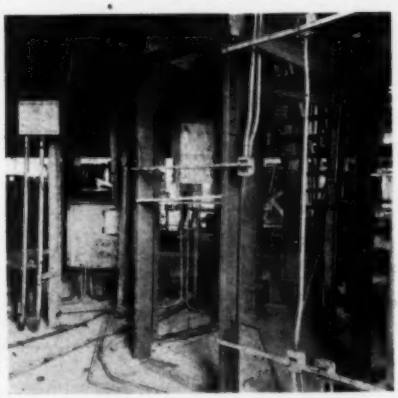
Photo-Cell Shower Control

To economize on the water supply automatic valve controls were provided for the municipal swimming pool at Moline, Ill., to operate a set of "straddle showers." A photo-electric relay was recessed in the

wall of the shower aisle at the opposite end from a light source projection unit that is attached to a pipe stanchion at the center of the aisle, in the right foreground. Bathers cannot enter the pool without passing through this aisle, and without also interrupting the beam of light. The interruption of this beam causes the photo-electric relay to function, operating magnetic valves in three perforated straddle shower pipes. The light source was set out of focus to obtain this view which shows the showers in operation. To prevent tampering with the light source which is so accessible, a recessed and guarded mounting has been suggested by the installers, Leithner & Weishar of Moline and Rock Island, Ill. The present light source mounting method is said to result in some trouble due to its getting out of focus.

Temporary Bracing for Wall Outlets

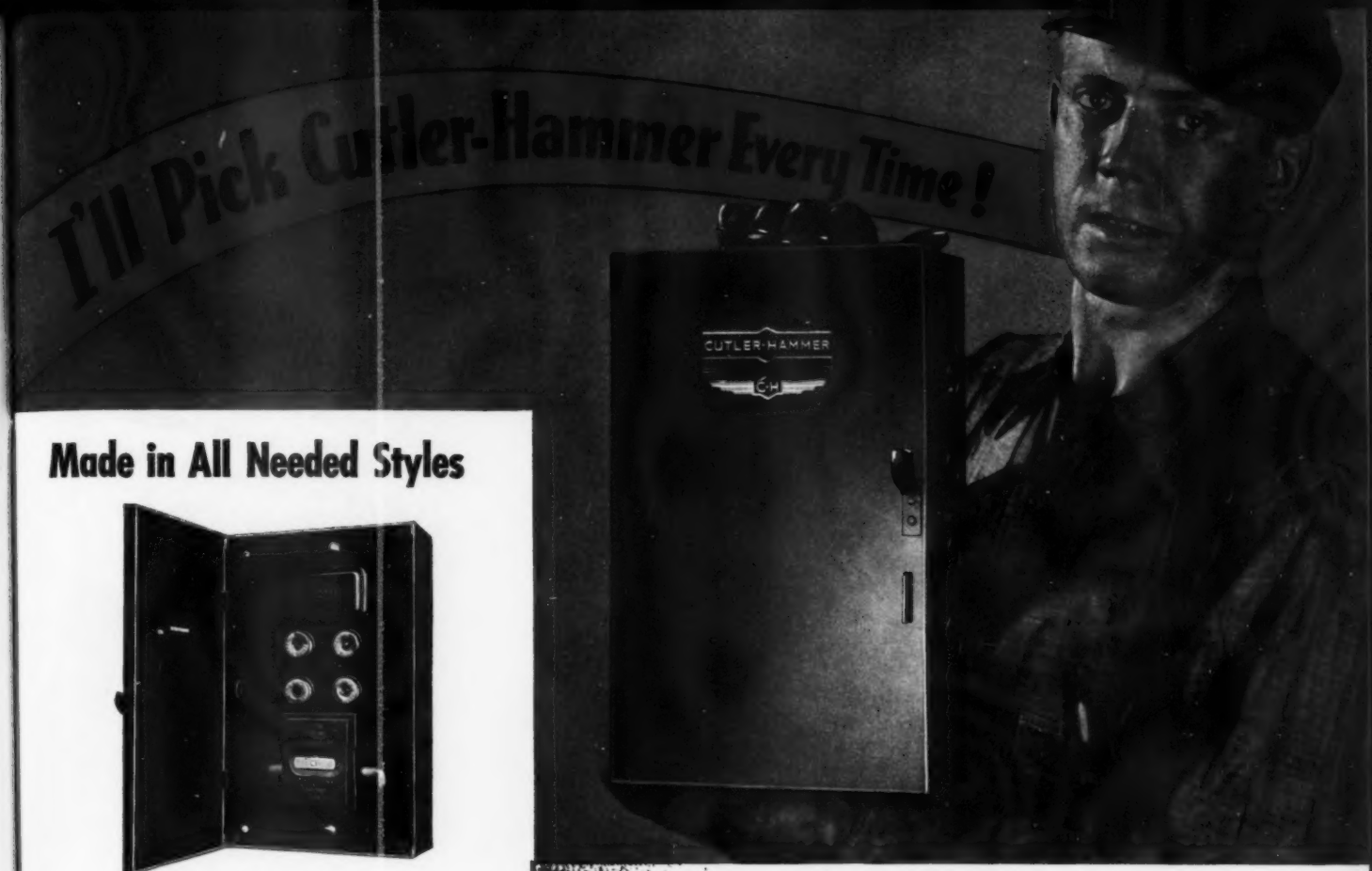
To make loose runs of conduit and outlet boxes "stay put" until bricked



in, Wright Brothers of San Antonio, Tex., provided horizontal wood strips to fasten these boxes in line with the face of various steel door frames. Each wood strip acted as a straight edge when it was wired securely to adjacent steel door members. The faces of the plaster covers were drawn tight to these wood strips, making them line up correctly, and holding them reasonably secure until the partitions were completed. This anchorage was necessary because the various runs of conduit that connected to such outlets were laid upon the rough concrete floor, to be covered later with concrete fill.

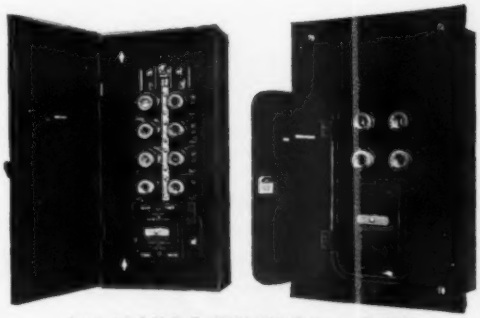
Flexible Load Distribution Centers

From 20 to 30 feeders, ranging from 60 amps. to 1200 amps. are controlled at various load distribution centers that were provided



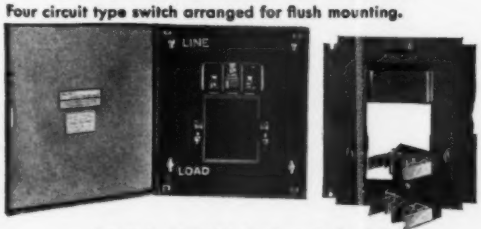
Made in All Needed Styles

C-H Bull. 4330-H8 Entrance Switch
Popular four circuit type arranged for surface-mounting.



(At Left) **C-H Bull. 4330-H10 Entrance Switch**
Eight branch circuit type arranged for surface mounting, with plate removed to illustrate the provision of individual knock-outs side and back for each branch circuit.

(At Right) **C-H Bull. 4330-H4 Entrance Switch**
Four circuit type switch arranged for flush mounting.



C-H Bull. 4330-H2 (no branch circuits)
with dead-front plate and pull-out removed. Note convenient terminal arrangement and generous wiring space. C-H pull-out construction provides lowest possible contact temperature because switch blades are separate from fuse clips.

- It must be more than a coincidence that the more practical and extensive any electrical man's experience, the more insistent his preference for Cutler-Hammer service equipment.
- Such obvious quality construction as found in the C-H Bulletin 4330 line is a reasonable explanation of this preference. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus*, 1306 St. Paul Ave., Milwaukee, Wisconsin.
- **C-H BULLETIN 4330...A BETTER FRONT-OPERATED 60 AMPERE SERVICE SWITCH**

C-H Bull. 4330 is a 60 ampere dead-front service switch, available with 2, 4, 6 and 8 branch circuits, arranged for either flush or surface mounting, for grounded neutral service. The main switch is of the pull-out type. Branch circuit blocks are genuine Thermoplax, extra strong, and unaffected by heat. Solderless connectors are used throughout.

CUTLER-HAMMER C-H SERVICE SWITCHES

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Stop Waste
Obsolete, Deficient Electric Circuits
Handicap Both Capital and Labor
CAPITAL
LOSES PROFITS
LABOR
LOSES WAGES
9 out of 10 factories
incur needless losses because
of failure to modernize wiring
Modernized wiring aids plant
operation in these 6 ways
1 Prevents breakdowns that retard production and cause labor to lose wages.
2 Prevents light losses and slowing down of machines due to voltage drop.
3 Permits shifting of equipment or installation of new machinery with minimum delay.
4 Lowers maintenance and repair costs.
5 Prevents dissipation of power in form of heat.
6 Protects safety of workers and lowers insurance rates.
Anaconda Wire
ANACONDA
from mine to consumer

10 WAYS TO TIE IN

1 Organize electrical maintenance engineering groups.

2 Encourage your electrical association to sponsor industrial exhibits and meetings.

3 Publicize in local papers, new or modernized installations.

4 Initiate industrial wiring surveys.

5 Arrange for talks before industrial groups.

6 Encourage safe wiring in conjunction with safety campaigns.

7 Establish a definite plan to tie in with the Anaconda campaign or with local activities.

8 Impress your employees with the advantages of aggressively promoting better industrial wiring.

9 Select prospects carefully, send them literature, urge that wiring surveys be made.

10 Develop methods of "following" industrial and commercial building permits.

"Yes... let's get behind it"

Cash in! Here's a way to get more wiring contracts

SCORES of factories need new, modernized wiring! Everybody in the industry knows it. And now, Anaconda "talks turkey" to plant managers about it. This program ties in with NECA thinking about adequate wiring and its promotion.

Shown here is one of the magazine ads in this campaign. Its keynote is "Stop waste!" It tells plant managers that they are letting dollars fly out of the window through losses due to obsolete wiring.

The "modernization" idea is sound. It is sound economics because it tells the factory how to save money. It is sound because it promotes the efficient use of electricity.

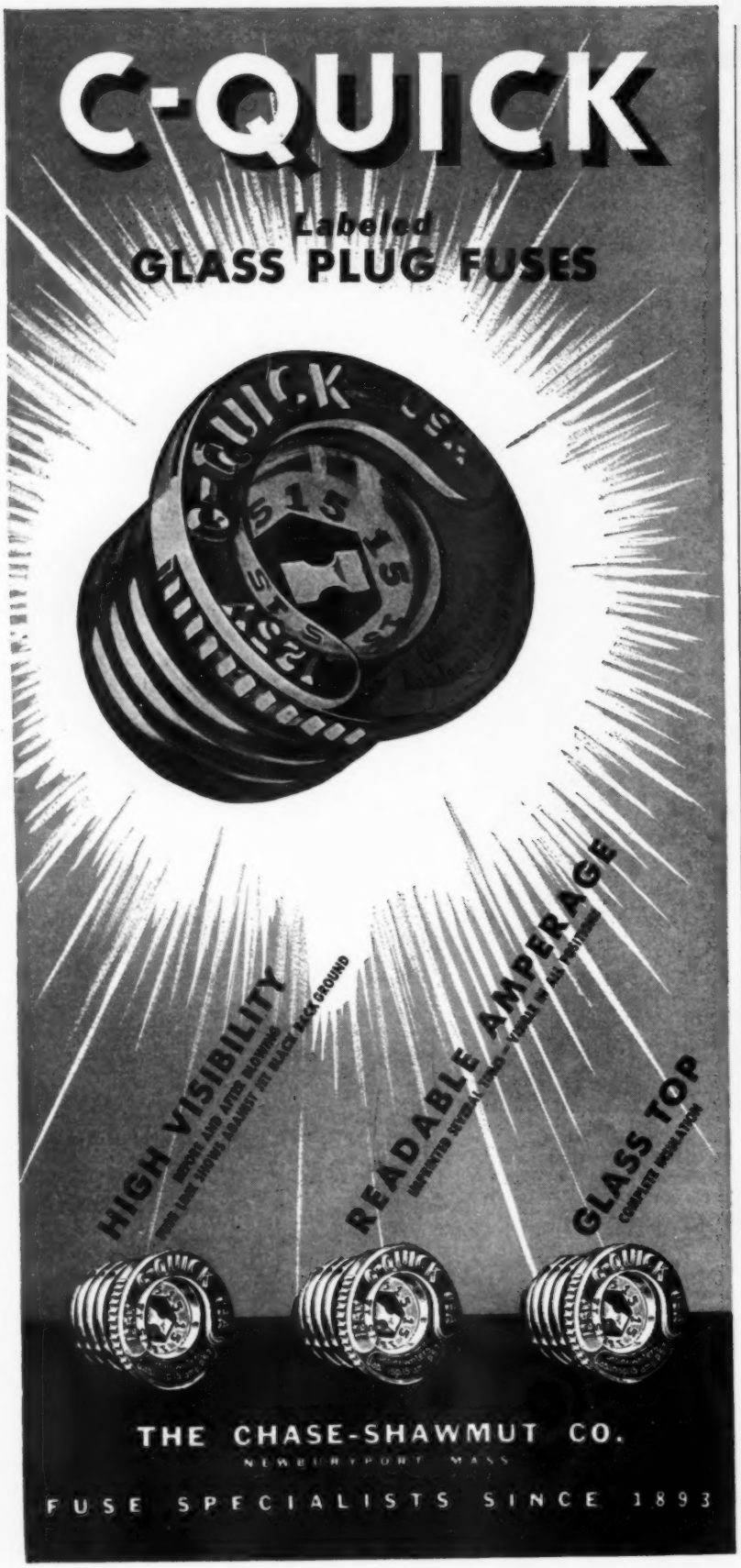
This campaign will benefit every one in the industry who ties up with it. It is designed to "open doors" for you. With its help, you can better demonstrate to plant managers why it will pay them to modernize. You should get profitable wiring contracts as a result. Cooperate with this advertising. On the opposite page, we suggest definite steps you can take. Study these suggestions carefully and send for our illustrated booklet.

Anaconda advertisements appear regularly in the magazines shown opposite. They are: *Time... Business Week... Factory Management and Maintenance... Automotive Industries... Steel... Textile World... Chemical & Metallurgical Engineering* and *Coal Age.*

We aim to reach industrial leaders everywhere. Join in with this program. You'll find that these messages "open doors" for you.

Anaconda Wire & Cable Company

25 BROADWAY, NEW YORK 4 · 20 NORTH WACKER DRIVE, CHICAGO 6 · Sales Offices in Principal Cities



adjacent to 4-k.v. transformer banks at the Dallas, Tex., Centennial grounds. To provide maximum safety and flexibility for the feeders that were installed to serve various concessions and exhibitors, separate locked distribution rooms were provided. The four walls were lined with lumber panels to receive the various feeder switches. The 3-ph. 4-wire bus bar main feeder was racked around the wall on an angle iron frame-work, while the load side conductors were routed along the floor to their outgoing raceways through a continuous 12-in. deep and 18-in. high wireway. When a contractor received a wiring order, the Centennial's engineers spotted the feeder switch location for him. The switch was connected by rubber-covered conductors that were lugged to the overhead distribution bus. A conduit nipple was installed between the switch and the floor wireway.

The room that is shown contains a busbar system comprising three ¼-in. by 4-in. buses per phase. The 1200-amp. circuit breaker at the right background controls a portion of the Esplanade mobile floodlighting system. Batteries supplying emergency lights in several adjacent exhibit halls are racked in the center of the distribution room, and are placed in service by an automatic throw over switch whenever the main current supply fails.

Sweep Fittings to Reduce Cable Bends

With nine 500,000-cm. conductors to install in crowded quarters in connection with modernizing an underground service entrance, W. H. Jenks

of Richmond, Va., designed a sectional sheet steel raceway which terminated in "sweep" end fittings for lessening angular deflection of these conductors where they were connected. The straight sections were made 3-in. by 7-in., of 11-ga. metal, with removable covers. The flanged-out fittings at the ends were designed to be fitted to the service equipment and to an existing junction box. The end-fitting in the left background was provided with a

Elected THE CHOICE OF AMERICA!

BULL DOG Vacu-Break SAFETY SWITCHES

Meet Every Modern Requirement for SAFETY, EFFICIENCY and APPEARANCE The VACU-BREAK principle of circuit rupturing—an exclusive Bull Dog feature—gives a higher degree of safety against arcing and makes possible smaller and more compact cabinets without sacrifice of adequate wiring space. Stylized cabinets, with handles to match, give a distinctive outward appearance which reflects the finer inward quality. Bull Dog VACU-BREAK Safety Switches are the safest, most efficient, most modern yet created.

ILLUSTRATED ABOVE—Heavy-Duty (Class A) VACU-BREAK Safety Switch, 60 Amp., 250 Volt, 3 pole, Fusible.

RIGHT—Exterior view of the Steel-Clad cabinet.

• IN LIGHTING PANELS IT'S BULL DOG SWITCH FUSE CENTERS

(Above) "PX" Type Plug Fuse Only; 8 to 40 Circuits

(Right) "PSX" —"CSX" Types Toggle Switches and Plug or Cartridge Fuse; 4 to 40 Circuits

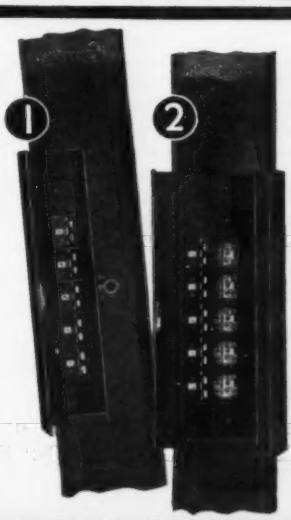
(Bottom) "PS" Type Plug Fuse & Toggle Switches; 4, 8 and 12 Circuits

Complete Lines . . New and Improved

SWITCH-CENTERS are now available for every type of installation ranging from Residences and small Stores to the largest Commercial and Industrial Buildings.

From 4 to 40 Circuits with MAIN LUGS, MAIN SAFtoFUSE or MAIN FUSIBLE SWITCH. They are NEW, ORNAMENTAL and ECONOMICAL.

Specify BULL DOG to your Electrical Supplier



Narrow Column Type for Industrial Use . . . .

1: Right—panel and section of narrow column switch centers mounted between column flanges shown with one door open, exposing the toggle switches. Left side may be kept unlocked for switching lights. Right side covering fuses and gutter may be locked.

2: Section of Bull Dog narrow column switch centers with doors open, exposing switches, fuses and side wiring gutter. Column type switch centers conserve space.

BULL DOG ELECTRIC PRODUCTS COMPANY

Manufacturers of Safety Switches, Fusecenters, Light and Power Panel Boards, Switchboards, Duct Systems

DETROIT, MICHIGAN

BULL DOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO, ONT.

The SIGHT-CRAFT 'APOLLO'
SETS A RECORD FOR POPULARITY

over
15,000
'APOLLO'
LUMINAIRES

are furnishing shadowless illumination

IN NEW AND MODERNIZED OFFICE BUILDINGS

This beautiful, efficient luminaire fills your demands for BETTER LIGHT AT LOWER COST

The 'APOLLO' has met with favor because it most adequately fills the demand for a luminaire that produces the high intensity standards recommended and conceded as essential today to eye comfort and efficiency. . . . BUILDING MANAGERS find it easier to lease offices lighted with the 'APOLLO.' They find the initial cost low and the maintenance cost less because the all-metal surfaces of the 'APOLLO' are easier to clean and there's no glass breakage—no deterioration. . . . RENTERS find that desks can be arranged in any position because the SIGHT-CRAFT 'APOLLO' eliminates shadows and glare. . . . CONTRACTORS find it easier to sell because it has all the plus features of a really expensive unit. A sample in your display room will help you close more lighting jobs. Order from nearest office.

WRITE FOR COMPLETE CATALOG ELC-1136

SMOOT-HOLMAN COMPANY
SIGHT-CRAFT
INGLEWOOD, CALIFORNIA

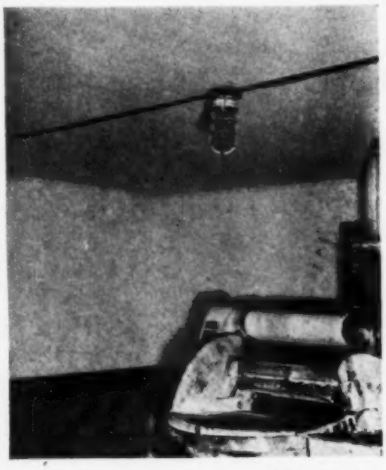
SMOOT-HOLMAN COMPANY
INGLEWOOD, CALIFORNIA

STOCKS CARRIED IN NEW YORK, BOSTON, ST. LOUIS, SAN FRANCISCO, INGLEWOOD, SEATTLE, HOUSTON

30-in. wide opening, and its companion sweep fitting has an opening 20-in. wide. Because of the limited space available and the number of changes in direction occurring in this run, this method was chosen to avoid sharp cable bends. The cables could be fanned out with less trouble at connection points in relation to the phase terminal positions.

Lamp Breakage Protection

To prevent the accidental breakage of a lamp occurring over dough processing machines in the low-ceiling areas of a Raleigh, N. C., bakery,



guarded vapor-proof lighting fixtures were installed. Although the area did not require this type of equipment, the additional cost of outer glass globes and guards was considered to be nominal compared with the dough that would be ruined and the time that would be lost if particles of glass from a broken bulb were to fall into a batch of dough. This work was done in connection with a modernization program by McKenzie & Separk, local electrical contractors.

Phase Identification Code for 4-Wire Systems

To standardize the d.c.-to-a.c. changeover operations that are now in progress in downtown Chicago, Ill., the electrical inspection department has adopted the following colors for 4-wire 3-phase systems: "A" phase, black; "B" phase, green; "C" phase, red; and grounded conductor, white or grey. This recommended code is being carried out from the service conductors throughout the entire systems. Wires or cables in sizes that are not readily obtainable with colored outer coverings may be identified with paint or enamel at their various terminals.

● DUTCH BRAND Friction Tape is different . . . it is purposely made so it will stick on both sides! . . . and stick tight for years . . . in any climate.

It is that fourth or extra layer of new, live rubber that gives DUTCH BRAND its unusual adhesiveness, just another of its popular and practical "Extra Service" qualities. In addition to longer life, double insulating strength and true-cut, non-raveling edge, DUTCH BRAND is good just because it's made better—for which you pay nothing extra.

DUTCH BRAND *Friction Tape, Rubber Tape and Soldering Paste are sold by electrical jobbers everywhere.*

VAN CLEEF BROS. Est. 1910
Manufacturers
Woodlawn Avenue, 77th to 78th Streets
Chicago, U. S. A.

The Jumbo Package
Contains 10 standard No. 8 rolls, the economical way for repairmen, electrical contractors and industrial users to purchase Friction Tape where individually cartoned tape is not required.

Standard Packages
The Nos. 8, 4, 2 and 1 sizes are all available in the well known orange and blue individual and display cartons and metal counter dispensers for retail sale.

DUTCH BRAND Rubber Insulating Tape
Fuses instantly without heat. Molds into one solid piece. It s-t-r-e-t-c-h-e-s without breaking because it contains more live, new rubber. Approved by Underwriters Laboratories.

This is how a piece of DUTCH BRAND Friction Tape would look if magnified and separated into its parts. It's the fourth layer that gives DUTCH BRAND many of its unusual qualities.

DUTCH BRAND *Friction Tape*
EXCEEDS THE QUALITY SPECIFICATIONS OF THE A. S. T. M.

WIREMOLD 4-A

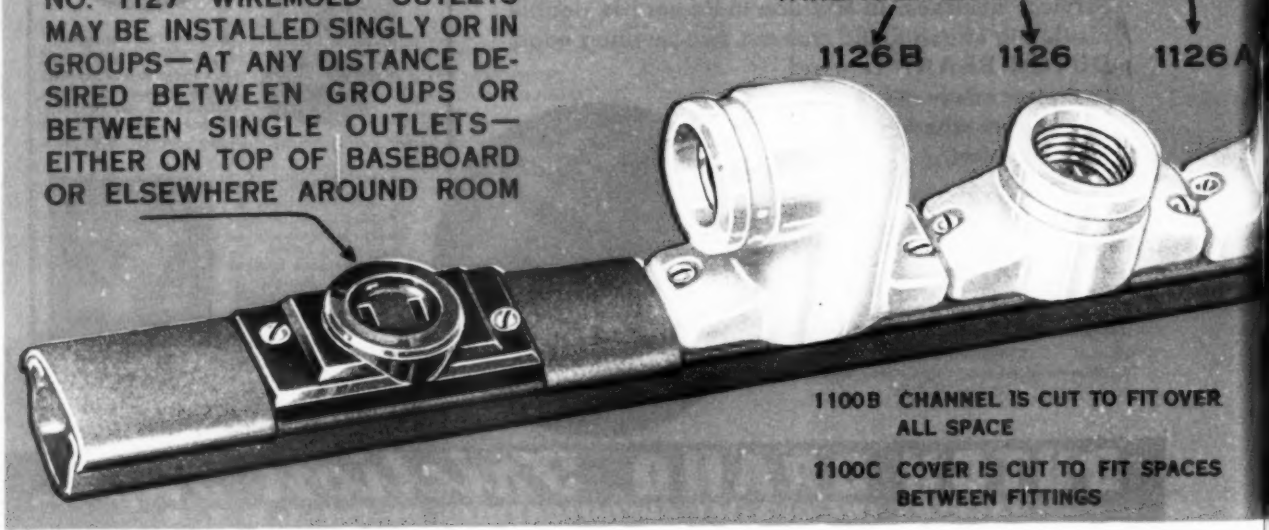
ONE STRIP THAT HAS EVERYTHING — DOES EV

A
MULTIPLE OUTLET STRIP
USING NO. 1127 STURDY WIREMOLD OUTLETS ON 3-IN. CENTERS -- OR AT ANY OTHER DESIRED DISTANCES APART
A
A
WINDOW LIGHTING STRIP
USING NOS 1126, 1126A AND 1126B WIREMOLD SOCKETS OR 1123 AND 1123A SOCKET HOLDERS
A

NO. 1127 WIREMOLD OUTLETS MAY BE INSTALLED SINGLY OR IN GROUPS—AT ANY DISTANCE DESIRED BETWEEN GROUPS OR BETWEEN SINGLE OUTLETS—EITHER ON TOP OF BASEBOARD OR ELSEWHERE AROUND ROOM

WIREMOLD LAMP SOCKETS

1126B 1126 1126A

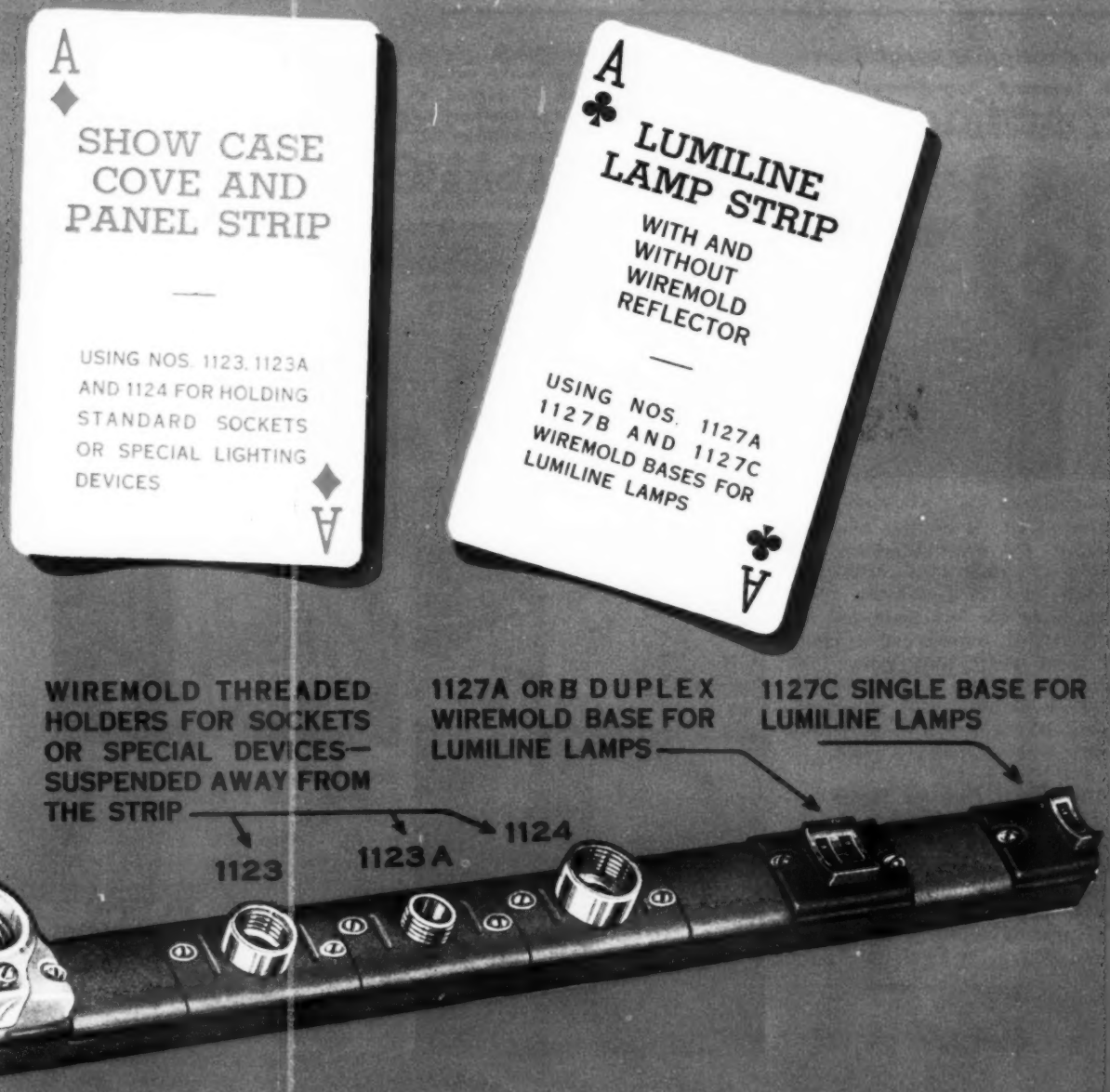


1100B CHANNEL IS CUT TO FIT OVER ALL SPACE

1100C COVER IS CUT TO FIT SPACES BETWEEN FITTINGS

ACE Combination!

EVERYTHING — AND PLEASES EVERYBODY!

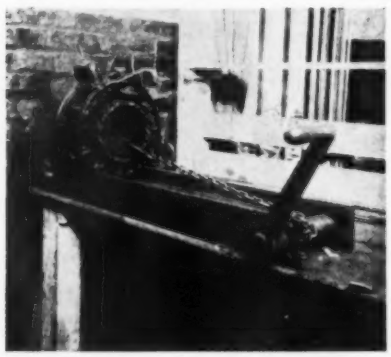

A
SHOW CASE COVE AND PANEL STRIP
USING NOS. 1123, 1123A AND 1124 FOR HOLDING STANDARD SOCKETS OR SPECIAL LIGHTING DEVICES
A
A
LUMILINE LAMP STRIP
WITH AND WITHOUT WIREMOLD REFLECTOR
USING NOS. 1127A 1127B AND 1127C WIREMOLD BASES FOR LUMILINE LAMPS
A
WIREMOLD THREADED HOLDERS FOR SOCKETS OR SPECIAL DEVICES— SUSPENDED AWAY FROM THE STRIP
1123
1123A
1124
1127A OR B DUPLEX WIREMOLD BASE FOR LUMILINE LAMPS
1127C SINGLE BASE FOR LUMILINE LAMPS

This is not an example of actual practice—but it does illustrate and demonstrate the fact that this single strip "does everything"—by use of proper fittings. Write Wiremold Company, Hartford, Conn., for further details

Service Shop . . . Practice . . . . .

Stator Stripping Hand Winch

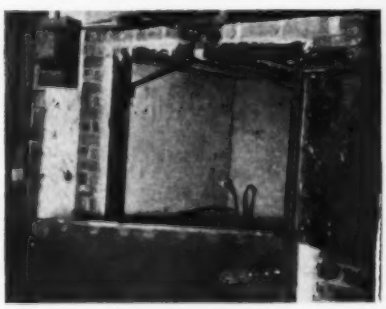
A compact top-of-bench hand winch is used for pulling stator windings in the service shop of J. W.



Wilson, Macon, Ga. After the stub-bed end of an old winding has been cut away, the stator is placed and secured with chain hooks in the hollow web of a 12-in. I-beam. This beam forms the bed plate for the winch, which consists of a crank and roller shaft upon which the coil-pulling chain is wound. A grab-hook on this chain is shaped to be easily tapped into a position to engage the looped coil ends.

Slotted-Roof Baking Oven

A slotted roof was designed for a baking oven which clears a hoist chain and thus permits the placing of heavy equipment within the oven directly from a ceiling monorail. Now nearing completion in the service shop of the Electrical Equip-



ment Company of Raleigh, N. C., this design is expected to eliminate rolling hot trucks or dollies out of the oven, and moving heavy equipment around by hand. The roof is lined with two courses of fire bricks, these being set on steel supporting grids and angle brackets. A 3-in. center-wise slot in the steel grid structure has courses of loose bricks directly above, which may be laid aside when a heavy piece of equipment is to be put into the oven. The 44-in. wide steel doors are split in two sections each 31 in. high to facilitate the placing or removal of small equipment or racked coils without opening the entire door area.

Safety Electrodes for Breakdown Tests

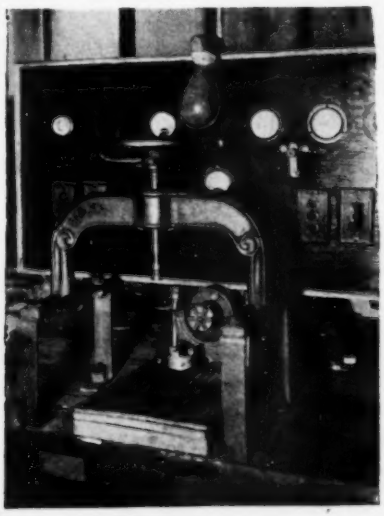
To test armatures at high breakdown voltages in the shop of the

H. J. Electric Company, Inc., New York, N. Y., a pair of insulated, pin-pointed electrodes and flexible leads was made up which permit making good electrical contact with maximum safety to the mechanic. Single-conductor ignition cables were soldered to copper contact tips. These leads form a side or "T" connection. Insulating handles of ⅜-in. hollow fibre tubing are attached to the contact studs to make an assembly 12-in. long. When tests are made the leads are out of the mechanic's way and receive a minimum amount of flexing, while the mechanic is able to apply firm contact pressure to an armature without liability of a shock.

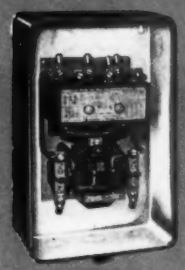
The test leads are detachable, being connected to the male half of a stage connector, which is plugged into the female half which is mounted underneath the work bench. High-voltage supply is derived from a 2-kw. 110-750/1500-volt air cooled transformer that is also mounted under the bench together with switch controls.

Test Stand for Small Motors

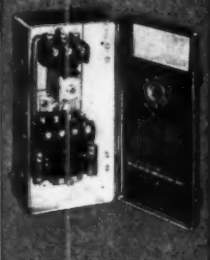
For testing its reconditioned motors ranging up to 1 hp., the Curtis Electric Company of Chat-



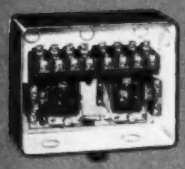
tanooga, Tenn., designed a quick-coupling outfit that uses a d.c. generator load and which includes a treadle operated friction yoke clutch for applying sudden brake loads to the generator pulley. Motors to be tested are aligned to engage a semi-flexible two-member sprocket-face coupling assembly that has interchangeable bushings on the motor shaft half for taking the usual range of small motor shaft diameters. No bolts are needed to secure the motor feet, as a heavy wheel and pressure screw clamps the motor upon the bench. An addition yet to be made will provide for elevating the motor platform by a similar screw beneath the bench to speed up the levelling of motor shafts with the generator. At present motor levelling is done with an assortment of wooden shims. With a flexible arrangement of meters and circuit controls directly in front of the test



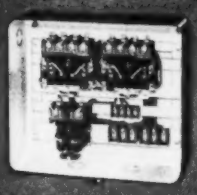
Bulletin 709 solenoid type across-the-line starting switch.



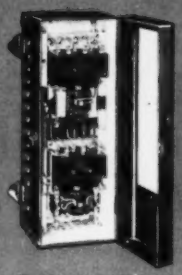
Bulletin 712 combination solenoid starter and disconnect switch.



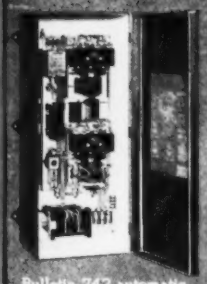
Bulletin 705 solenoid type automatic reversing switch.



Bulletin 715 automatic two speed, consequent pole solenoid starter.



Bulletin 740 solenoid type automatic resistance starter.



Bulletin 742 automatic stepless compression resistance starter.

STARTERS FOR EVERY TYPE OF CONTROL

Solve Your Special Control Problems with These Standard Allen-Bradley Controls

ACCESSORIES FOR EVERY TYPE OF CONTROL

Bulletin 800 Type N-1010 "start-stop" push button station.

Bulletin 800 Type N-1310 water-tight "on-off" control station.

Bulletin 800 Type N-1050 two button station with selector switch.

Bulletin 800 Type 1080 five button multi-speed control station.

Bulletin 801 Type L-102 center roller spring return limit switch.

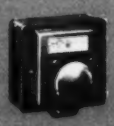
Bulletin 801 Type L-300 single roller two circuit limit switch.

Bulletin 801 Type L-150 rod or chain operated limit switch.

Bulletin 801 Type L-210-R single roller snapover limit switch.

Bulletin 802 plugging switch for quickly stopping motors.

Bulletin 804 shipper rod pilot switch, dust-tight and splash-proof.



Bulletin 830 pressure switch. Available with overload protection.

Bulletin 840 float switch. Various accessories are available.

Bulletin 860 a-c solenoid. Built in 8 sizes and various mountings.

Bulletin 700 solenoid type magnetic contactor in 200 types.

Bulletin 700 solenoid contactor with low voltage transformer.

Bulletin 815 resistotherm relay for motor overload protection.

Bulletin 821 combination magnetic inductotherm overload relay.

Bulletin 410 three tube graphite disc compression rheostat.

A COMPLETE LINE OF MOTOR CONTROL EQUIPMENT

ALLEN-BRADLEY

1307 S. FIRST ST.
MILWAUKEE, WIS.

ENCLOSURES FOR EVERY TYPE OF SERVICE

Type B (NEMA Type 4) water-tight, weather-proof enclosure.

Type D (NEMA Type 9) dust-tight enclosure for hazardous dust.

Type E (NEMA Type 9) enclosure for non-hazardous dust.

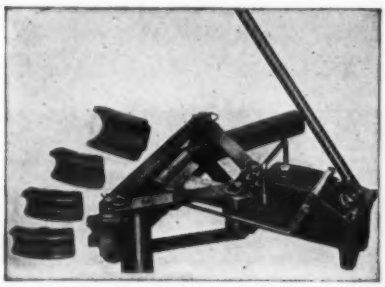
Type G (NEMA Type 7) explosion-proof cast iron enclosure.

Type H (NEMA Type 8) explosion and corrosion-proof enclosure.

Type J corrosion-proof enclosure with oil-immersed switch.

GREENLEE
PROFIT MAKERS
For The Electrical Contractor

THE greater the efficiency of the tools you use, the more chance you have of meeting competition and making a profit on each job. That is why Greenlee Conduit Benders and Knockout Tools are so popular. They cut costs on every job and are liked by the men who use them.



Hydraulic Conduit Benders

Greenlee Hydraulic Conduit Benders insure profits, because they bend conduit quicker and easier than by other methods. In addition, they make smooth, even bends, eliminating many fittings and making it easy to pull in wire and cable. They are easy to take to the job, too, because they are readily portable.

Knockout Tools

Greenlee Knockout Punches and Cutters are time savers and profit makers, because they make it easy to enlarge holes in switch boxes, cabinets, etc. They form clean-cut holes quickly and accurately, without any reaming or filing.

Other Tools

Hydraulic Pipe Pushers
Joist Borers **Bit Extensions**
Electricians' Bits

Let us send complete information, without obligation to you. Just use the convenient coupon.

GREENLEE TOOL CO.
ROCKFORD ILLINOIS

GREENLEE TOOL CO.
ROCKFORD, ILLINOIS

Please send complete information on the following:

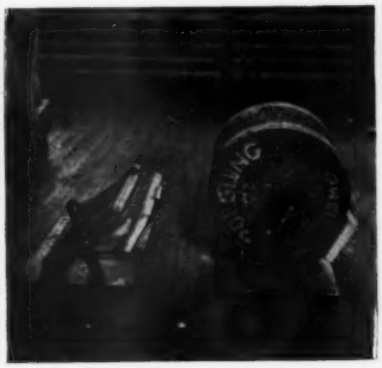
☐ Conduit Benders
☐ Knockout Tools

Name .....
Street .....
City .....
State .....
My Jobber is.....11-36

stand, the operator can apply any desired load condition with a minimum amount of effort.

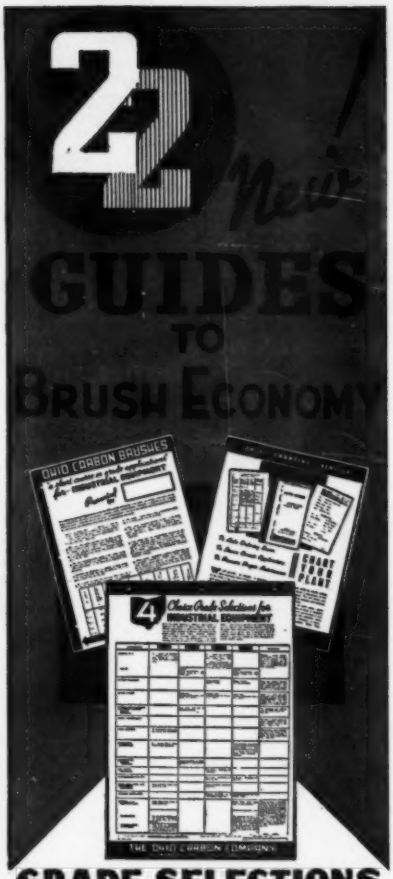
Single-Spool Tension Device

Spools of magnet wire measuring 12 in. in diameter may be lined up on the shop floor for one, two or three-in-hand coil winding without having reel overrun trouble with reelholders that are used by the A. C. Motor Service Company, Jersey City, N. J. This reel is found useful for running off small amounts of wire quickly as in over-the-counter sales. Automatic floating tension is claimed that does not cause injury to the insulation of maget wire, nor stretch nor elongate small conductors. The reel rotates on a spindle which fits into a pair of yokes that provide automatic floating tension. Any overrun is checked automatically as the weight of the reel tips back into contact with a wood braking block that is bracketted at the off-side of the assembly. Side braces have slotted openings and wing nuts for adjusting the tipping angle of the mounted reel. These side braces have slotted holes at the base to allow the normal forward pull, when winding a coil, to free the reel from contact with the brake shoe. Each device is mounted on a 10½-in. by 13-in. cast iron base which may be fastened with screws to the shop floor.



Use Yard Space for Dismantling Transformers

Valuable shop space is released for other uses by storing and dismantling large power transformers in the factory yard at the Stephen Hall & Company motor sales and reconditioning plant, Hoboken, N. J. Here a rigid timber frame and overhead hoist has been set up for unloading large power transformers. They may easily be dismantled at this location and their long cores removed from their cases without interfer-



GRADE SELECTIONS *Simplified*

Don't wade through masses of application data (not wrong but unnecessarily complicated) because here's the information you want... definite, complete, correct.

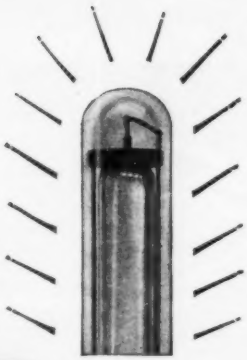
With aid of these charts and our stock list of popular industrial sizes, you can easily determine the proper proportions of a good brush inventory.

NO OBLIGATION IS ATTACHED TO YOUR REQUEST FOR THESE CHARTS ADDRESS:

THE OHIO CARBON CO.
12508 BEREA RD. CLEVELAND, O.

FOR 250-WATT AND 400-WATT MERCURY VAPOR LAMPS

JEFFERSON TRANSFORMERS
INSURE FULL EFFICIENCY



The new mercury vapor lamps give more light per unit of current—reduce electric bills—Jefferson Transformers insure maximum economy.

Industrial plants, railroads, service stations, large stores—are finding the new high efficiency of mercury vapor lamps an immediate means of improving illumination and cutting electric bills in half.

Jefferson Transformers for use with these lamps insure the expected full rated capacity and satisfactory performance. They keep the current demand low during the starting period and on continuous operation show low temperature rise. A special core has been designed, made up of very thin laminations of high silicon steel, annealed after punching to prevent ageing, and to insure cool operation.

Easy, "Screw-Driver" Installation

The terminal connections are easily made with a screw-driver,—no pigtails to solder.—And the wiring compartment covers have permanently attached screws to save time and loss.—Width and depth are smaller to improve appearance.

Jefferson's long specialized experience in the development of transformers for mercury vapor and Neon luminous tubes, sun lamps, street lights and the like, makes possible the high quality special types of transformers and reactors required for these vapor lamps.

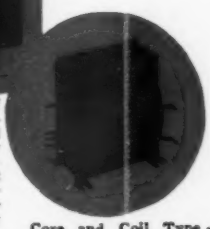
Available for use with both 250-watt and 400-watt lamps. Write or mail coupon for Bulletin 361-MV.

Wall Mounted Type in neat metal case for mounting on wall or post. Bottom is open for ready access to wiring compartment. Snap-on connections make it easy to match primary supply line voltage.

(Wall-mounted and fixture types are equipped with primary tap changing device and large primary and secondary wiring compartments.)

Fixture or Suspension Type for mounting between ceiling and lamp—with standard threaded coupling at each end.

Weather-proof Type in one-piece drawn steel case — interior compounded. Connections at bottom. Equipped with primary tap changing device.



Core and Coil Type — which fits in fixture. Vacuumized, impregnated with final double varnish dip bake.

JEFFERSON ELECTRIC COMPANY
BELLWOOD (Suburb of Chicago) ILLINOIS
Canadian Factory: 535 College Street, Toronto

MAIL THE COUPON

JEFFERSON *Mercury Vapor Lamp* Transformers

JEFFERSON ELECTRIC COMPANY,
BELLWOOD, ILLINOIS

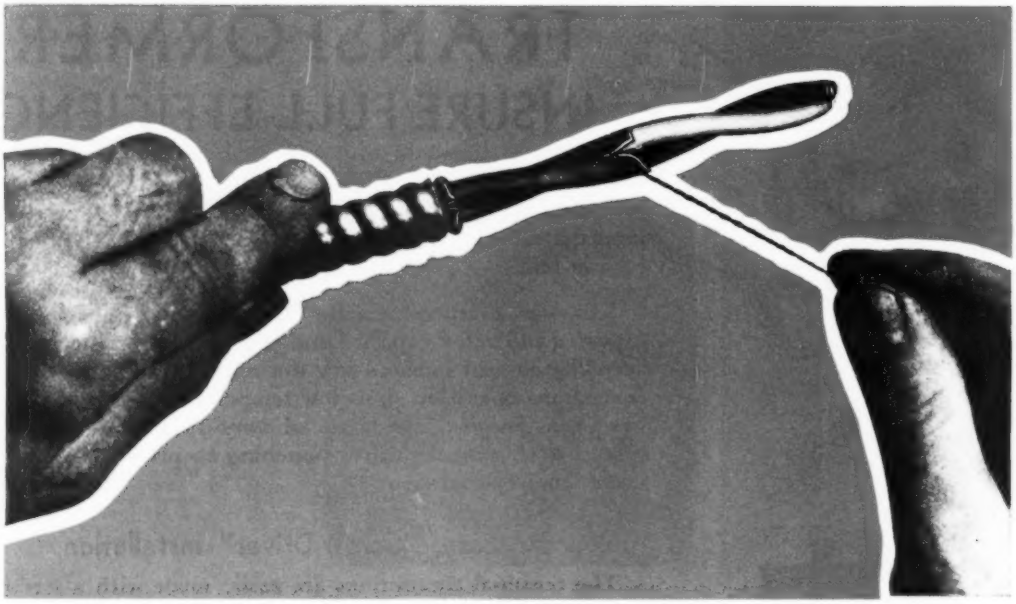
Please send Bulletin 361-MV and complete information on Mercury Vapor Lamp Transformers.

Name _____

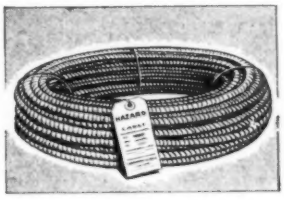
Address _____

City and State _____

A QUICK TUG . . .
and the paper is Off



HAZARD
ARMORED CABLE
SAFE *and* CONVENIENT



SAFE because of the high quality of the HAZACODE rubber insulated conductors; the moisture resisting, flame-retarding finish of the braids; and the moisture and flame-proof wrapping enclosing the conductors.

CONVENIENT because the quick strip feature saves time for the wireman. One tug and the paper is off! And the rubber insulation strips easily, leaving the conductor clean and bright.

Your request will bring samples and literature.

The bushing has the distinctive projection which holds it firmly in place and prevents the cut edge of the steel from injuring the insulated conductors.

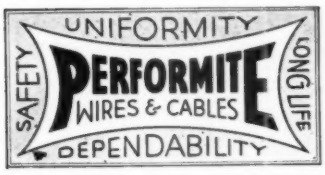
HAZARD INSULATED WIRE WORKS
Division of the Okonite Company
WORKS: WILKES-BARRE, PA.
Sales Offices:
New York Chicago Philadelphia Pittsburgh Buffalo Boston Detroit
Atlanta Seattle Dallas Washington San Francisco Los Angeles

The mark of Reliability

Hazard Performite Safecote is made by the Hazard Insulated Wire Works (38 years of experience) a division of The Okonite Co.

The mark of Confidence

Hazard Performite Safecote is built to Safecote standards — a flame retarding, moisture resistant braid covering that inspires Confidence.



The mark of Long Life

Performite is a higher type of insulation with a super-performance in aging tests. It is a tougher and stronger insulation with longer life.

HAZARD PERFORMITE SAFECOTE BUILDING WIRE

provides all of the qualities that give long-lived, fire and moisture resistant building wire. It will last as long as the building itself. The Government has adopted this super-aging insulation for Federal buildings and other purposes. It is standard for fire alarm, police signal and traffic control cable. Where it is essential to have the best, there you will find Hazard Performite Safecote Building Wires.

HAZARD INSULATED WIRE WORKS

Division of The Okonite Company
WORKS: WILKES-BARRE, PA.

Sales Offices:

New York Chicago Philadelphia Pittsburgh Buffalo Boston Detroit
Atlanta Seattle Dallas San Francisco Los Angeles Washington

UMI

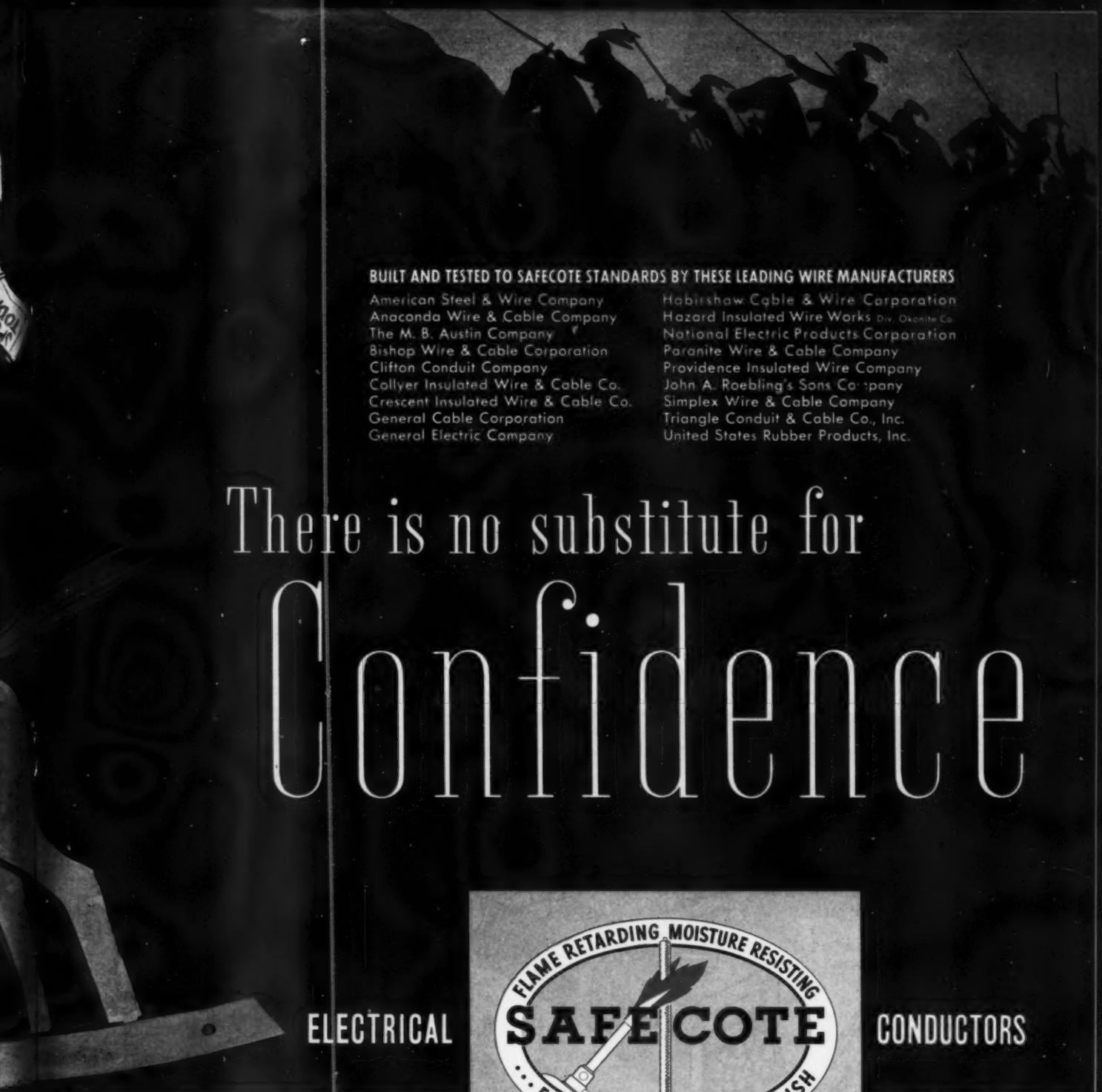
Man's strife for leadership often leads to imitation—his struggle for success frequently ends in substitution. Greatness has ever had many imitators—excellence many substitutes.

The great man never lived whose rivals did not claim equal greatness. No product truly great was ever without its "just-as-goods."

But leadership, be it in
tators—it draws with a
substitute.

There is no substitute
conductor that is flame re
fishable, SAFECOTE stand
dence as only leadership e

UMI



BUILT AND TESTED TO SAFECOTE STANDARDS BY THESE LEADING WIRE MANUFACTURERS

American Steel & Wire Company
Anaconda Wire & Cable Company
The M. B. Austin Company
Bishop Wire & Cable Corporation
Clifton Conduit Company
Collyer Insulated Wire & Cable Co.
Crescent Insulated Wire & Cable Co.
General Cable Corporation
General Electric Company
Habirshaw Cable & Wire Corporation
Hazard Insulated Wire Works Div. Okonite Co.
National Electric Products Corporation
Paranite Wire & Cable Company
Providence Insulated Wire Company
John A. Roebling's Sons Company
Simplex Wire & Cable Company
Triangle Conduit & Cable Co., Inc.
United States Rubber Products, Inc.

There is no substitute for Confidence

ELECTRICAL

FLAME RETARDING MOISTURE RESISTING
SAFECOTE
FISHABLE — SLICK FINISH
REG. U.S. PAT. OFF.

CONDUCTORS

U. S. LETTERS PATENT NUMBERS:
1,635,829 1,772,436 1,765,000
1,798,486 1,410,790 1,536,549
OTHER PATENTS PENDING

INSIST UPON GENUINE SAFECOTE FOR YOUR PROTECTION

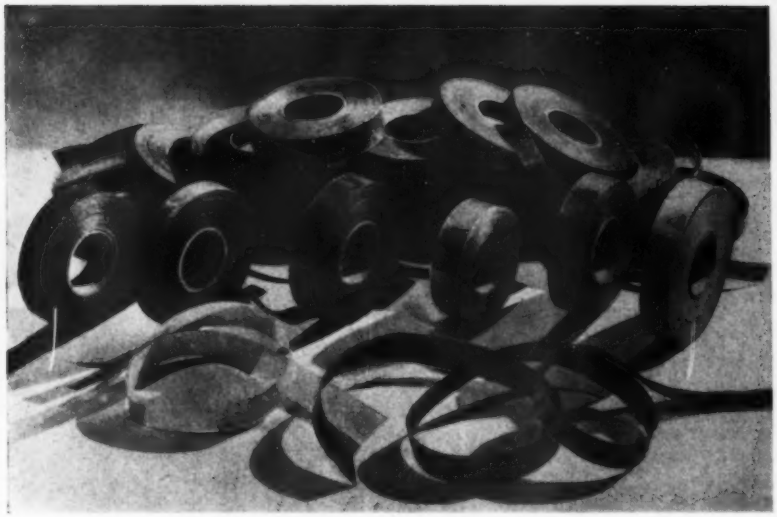
be it in product or in man, defies imi-
ys with a power all its own — it has no

substitute for SAFECOTE. The electrical
is flame retarding, moisture resisting *and*
COTE stands alone, backed by such confi-
eadership enjoys.

SAFECOTE LABORATORIES ARE AT YOUR DISPOSAL
SAFECOTE PERFORMANCE SPECIFICATIONS UPON REQUEST

GEORGE C. RICHARDS, LICENSOR'S AGENT
155 EAST 44th STREET, NEW YORK CITY

UMI



MICABOND tapes

INDISPENSABLE FOR EMERGENCY OR PERMANENT REPAIRS

Micabond Tapes are pliable without being tacky. They do not readily dry out under ordinary conditions. They are made in a variety of types. Let us send you samples—a post card will bring them. We shall also be glad to send you the complete MICABOND catalog.

CONTINENTAL-DIAMOND FIBRE COMPANY
NEWARK, DELAWARE

EITHER wrench or screwdriver can be used when making a connection with a BURNDY

SCRULUG

Think of it—your own common "garden variety" wrench or screwdriver is all you need to make a safe, sure solid connection with the Burndy Scrulug. Why play caddy to a bag of special tools or soldering equipment when it's so easy, so convenient to connect with Burndy?

In three sizes to take a range of cables from No. 14 solid to 1/0 stranded.

BURNDY ENGINEERING CO.
305 EAST 45th STREET · NEW YORK CITY

ence to other shop operations. All transformer windings in need of reconditioning are removed with the yard hoist and taken into shop. Only such transformer cases as actually need work performed on

them within the shop are taken inside. In addition to the large hoist, the left portion of this outfit includes a swinging boom and ½-ton chain hoist for dismantling, handling or unloading apparatus over additional areas not served by the main hoist.

Reconditioning Old Pulleys

It takes less than 15 minutes each to dress up old paper pulleys to make them look salable and suitable for being placed on the display rack.

They are made smooth with a file or scraping tool while chucked in the lathe, thus removing accumulations of grease and belt dressing. This smooth finish permits a coat of varnish being appplied to give a clean and glossy appearance. After pulleys are refinished in this manner in the shops of the Eifler Electric Company, Inc., Union City., N. J., their size and bore is stencilled on with orange enamel.

FRANK ADAM ELECTRIC CO.

General Office and Factory

3650 Windsor Place, St. Louis, Missouri.

Mail Address, P.O. Drawer 22

District Offices

ALBUQUERQUE, N. MEX.
ATLANTA, GA.
BALTIMORE, MD.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
DALLAS, TEXAS
DENVER, COLO.
DETROIT, MICH.
FLORIDA TERRITORY (TAMPA)
KANSAS CITY, MO.
LOS ANGELES, CALIF.
LOUISVILLE, KY.
MEMPHIS, TENN.
MINNEAPOLIS, MINN.
NEW ENGLAND (BOSTON)
NEW ORLEANS, LA.
NEW YORK CITY, N. Y.
NEW YORK STATE (SYRACUSE)
OMAHA, NEB.
PHILADELPHIA, PA.
PITTSBURGH, PA.
ST. LOUIS, MO.
SALT LAKE CITY, UTAH
SAN FRANCISCO, CALIF.
SEATTLE, WASH.
TOLEDO, OHIO
TULSA, OKLA.
CANADIAN OFFICES
CALGARY, ALTA.
MONTREAL, QUEBEC
TORONTO, ONT.
VANCOUVER, B. C.
WINNIPEG, MAN.

Export Office: Roy Chandler, Inc., New York City

ENGINEERING SERVICE

Recognizing the fact that our products are of a highly technical nature, we have built up an organization of sales engineers in our home office and district offices, who by long experience are competent to help the engineers and contractors in their problems of designing and specifying the electrical installations with the proper switches, panelboards and switchboards that the particular installation requires.

We therefore suggest to the engineers, when they have a project requiring our line of material, that they immediately call upon our nearest district office representative to give them the latest engineering data on our products. We are only too glad to assist the engineers and electrical contractors in every way, because we appreciate that this is a necessary service that we must offer in connection with our highly technical products.

EXPERIENCE

The Frank Adams Electric Company have been pioneers, and have for over forty years specialized in the design and manufacture of our line of products.

MANUFACTURING FACILITIES

The main office and manufacturing plant are in St. Louis, Mo.

The plant is a thoroughly modern fireproof building specially designed and equipped for the most efficient and economical manufacture of the company's specialized quality products.

[DISTRICT OFFICE REPRESENTATIVE]

DISTRIBUTION FACILITIES

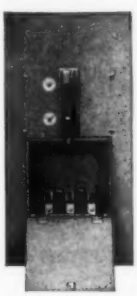
The manufacturing plant, being located in St. Louis, has plenty of skilled help available, has a short haul for supplies of raw materials and finished devices, and can ship to all parts of the United States promptly and at an economical cost. Furthermore we carry in most of the district offices sufficient finished stock for emergency demand.

STANDARDIZATION

The Frank Adam Electric Co. were the first manufacturers to apply the complete unit of either panelboard section or switches to the design and construction of lighting and appliance branch panelboards and distribution panelboards and switchboards, and also to the FA Major System of Pre-selective Remote Control for theatres and auditorium stage switchboards, with the result that these standardized unit constructed panelboards and switchboards are far better made today and at a lower price than ever thought possible ten or fifteen years ago.

The Frank Adam Electric Co. was one of the first manufacturers of these products to co-operate with the Underwriters' Laboratories, Inc., of the National Board of Fire Underwriters, to the end of making a better and safer product.

FA PRODUCTS



FA FUSLOK TYPE SWITCHES

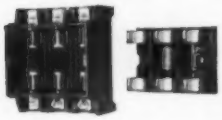
These fuse lock type switches are made in 30 to 600 ampere capacity inclusive, for 250 volts and less, and 30 to 200 ampere inclusive, for 600 volts, for general use, service equipment and horse power rating as listed in our catalog.

These switches are high grade rugged, quick make and quick break operating mechanism, with interlock for fuse compartment, and double break solid copper contacts, and are furnished for either flush or surface mounting as individual switches, or grouped in distribution panelboard or switchboard assemblies.

FA CIRCUIT BREAKERS

The Frank Adam Electric Co. is licensed to manufacture the De-ion type of circuit breakers and will furnish them in either individual enclosures or in assemblies for distribution panelboards and switchboards as well as light and appliance branch circuit use.

PULFUZSW (Pull Fuse Switch)

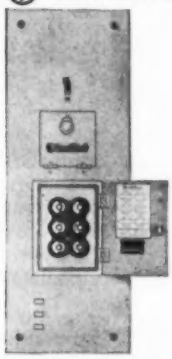


The Pull Fuse Switch is a special design and construction pull-out type of fuse switch with on and off position, and a special design of switch blade arranged to clamp the fuses when the switch is in the on position.

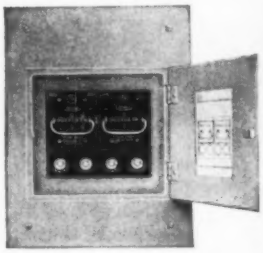
The Pulfuzsw is approved for general use and service equipment, and is furnished in separate enclosure or assembled with other similar units for main switch and range switch, and with 15 ampere branches for light and appliance circuits.

The Pulfuzsw is also assembled for distribution panelboards for power and light.

SERVICE EQUIPMENT

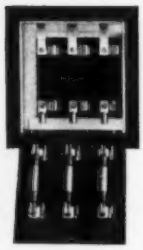


The Service Equipment includes the small units for residential installation carried on the wholesalers' shelves, as well as the special design and heavy capacity type for commercial and industrial and hotel buildings. We specialize on these service equipments for large capacities, where we include in one compact assembly, not only the main service switch, but the current transformer for the meter, large capacity and small capacity feeder branches, as well as light and appliance branch panelboards. They are economical in space requirements and in time and labor for installation.



DISTRIBUTION PANELBOARDS AND SWITCHBOARDS

Our several types of switches were all designed and constructed to be used in assemblies for panelboards and switchboards, and as all of these are special for each installation, we offer our engineering service to help the engineers to design and specify the right and proper design, capacity and construction of the distribution panelboards or switchboards. We recommend the panelboards for small installations and the switchboard type for large installations.



SWITCHFUZ

The Switchfuz is a rugged constructed hinge-type pull-out fuse disconnect switch, with on and off position, and is approved for general use and service equipment.

The Switchfuz is made in 100 to 1200 ampere capacity for 250 volts or less and 100 to 400 ampere inclusive for 600 volts.

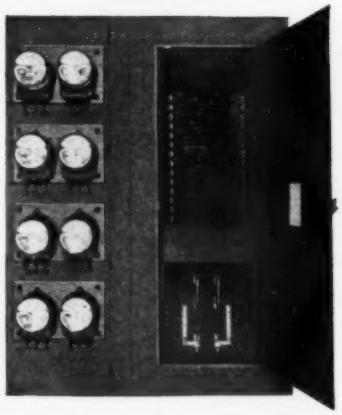
It is furnished for either surface or flush mounting as individual switches, or grouped in distribution panelboard or switchboard assemblies.

LIGHTING AND APPLIANCE BRANCH CIRCUIT PANELBOARDS

The Frank Adam Electric Co. assemble from various standardized panelboard section units both standardized as well as special design light and appliance branch panelboards, for either Edison plug or cartridge type N.E.C. fuse

connections, or with fuse connections and a rugged single, double or three pole tumbler switch. We also furnish standard and special design panelboards with circuit breakers for the main connection and for the branches.

METER CONTROL PANELBOARDS AND CABINETS



The Frank Adam Electric Co. was one of the earliest manufacturers to recognize the value to the owners of office buildings and loft buildings of the meter control panelboards for electric light and power, and have given considerable time and thought in developing the various types of meter control panelboards as best suited to the demand of small buildings, medium size buildings and large buildings.

Frank Adam
ELECTRIC COMPANY
ST. LOUIS

Here again we offer the engineers our special engineering service if they will call on our district office representative and place their project problems before our representative, and he will co-operate with them to the best of his ability to specify the most economical and the best adapted meter control panelboards and cabinets for the project.

FA STAGE SWITCHBOARDS

The Frank Adam Electric Co. design and build stage switchboards for purely manual control, modified manual and remote control, full remote control, five or ten all master pre-selective remote control and with the standard resistor or potentiometer reactor dimmers, or for motor driven remote controlled dimmer banks with a minimum size control station on the stage, or in the picture booth, or in both locations; also the FA Electronic tube control system, and also mobile, or manual-mobile illumination control for dining rooms, dance halls, auditoriums, night clubs or the outside of buildings.

FA SPECIAL STEEL BOXES AND CABINETS

The Frank Adam Electric Co. have one of the most complete sheet steel working shops in the country for the manufacture of the enclosures for switches, light and appliance branch panelboards, distribution panelboards and switchboards.

We also furnish all kinds and conditions of junction and pull boxes and telephone boxes.

SPECIAL FA PRODUCTS

FA FAN HANGERS

Many years ago an architect called upon us to furnish one of his jobs with an outlet on the wall that would both support and give connection to the wall type electric fan, and since that time we have developed several types of FA Hanger Outlets that are adaptable for hanging fans, pictures with illumination fixtures, clocks and glow heaters, also radios.

The FA Hanger Outlet is a real hanger outlet, because it is furnished with a stud upon which the fan or whatever should be hung can be actually hung onto, and then held in position by a washer and nut.

FA SECURITY TYPE FAN HANGER

This is furnished complete with FA special 4 in. outlet box and special cover with plaster keys for holding thin plastering over the box; also with Bakelite receptacle and struck-up heavy brushed brass face plate.

FA FIXTURE STUD TYPE FAN HANGER

This is the same as above, but without either the box or cover, the hanger arm being arranged to be supported on the standard 4 x 4 outlet box with rectangular cover and fixture stud, and held in position by a nut.

FA FHSB TYPE FAN HANGER

This is the competitive type that is arranged to be fastened into the rectangular cover of a 4 x 4 x 1½" standard outlet box, and for supporting the fan is dependent on the fastening of the rectangular cover to the box.

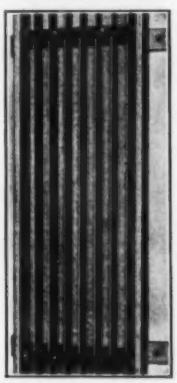
FA FLOOR BOX

We were called upon many years ago to design and produce an adjustable and reversible cover floor box that would be easy to install and get it flush with the finished floor and be readily adaptable for either a wire connection out of the box or for a plugging connection into a receptacle. These points are all taken care of in the Adjustable Floor Box.

FA CABLE AND WIRE DUCT

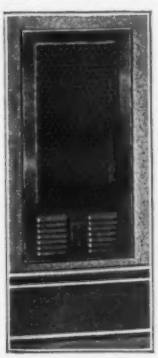
The Frank Adam Electric Co. have for many years made all kinds and conditions of special cable and wire duct for the FA Major stage remote control system, because of the necessity of bringing into a limited space the many wires between the stage pilot switchboard and the location of the remote control switchboard. The engineer having a large project of electrical installation should call on our district office representative and ask him to work out what kind and condition of cable and wire duct would be best adaptable for that particular project.

FA BUS DUCT



The Frank Adam Electric Co. have for many years designed and manufactured bus duct where this would be more desirable than cable wires for the main and subfeeders of a building. Where we will build any special design for an engineer, the engineer should call on our district office representative who will show photographs and details of the FA standardized bus duct, which we believe will be more adaptable to the average electrical installation because it is more economical to manufacture and takes less time to install, and is more a permanent part of the building structure.

FA ELECTRIC HEATERS



The FA QUIK-HETER is also a product that we were induced to specialize in because some of our customers, having seen some special heaters that were made up on a customer's demand, decided that they were better than any others on the market, and we first designed and standardized on a built-in heater, and then were practically forced into making the portable heaters because of the demand of our customers. So we now have electric heaters from 1000 to 3000 watts of the built-in type, and 1000 and 1500 watts of the portable type.

FA TECHNICAL PRODUCT

We again want to draw the engineer's and contractor's attention to the fact that we recognize our products as being of a highly technical nature, that we are not just selling a lot of copper, steel and insulating material and various devices, but we are actually selling an engineering service to make our products just right for the particular project that the architect has in hand, in our set-up is with a sales organization of experienced sales engineers in electric light and power installation, designing and construction.

Frank Adam
ELECTRIC COMPANY
ST. LOUIS

UMI

Lighting Data

Christmas Lighting

By Dean M. Warren

General Electric Company, Nela Park Engineering Department, Cleveland, Ohio

Electrical contractors can add to their Christmas seasonal business by performing a decorative service on either a rental basis or on outright sale. In either case, materials can be acquired gradually year by year as the displays grow in scope and number. It is important to obtain such materials and equipment that may be used numerous times and lend themselves to a number of arrangements. The well-known festoon of sockets and lamps is one example.

Christmas displays need not necessarily cost much. In the case of the East Orange, (N. J.) Business Men's Association, the installation ran about 25 cents per front foot. The decorative material was rented to the association by a contracting company which assembled, installed and removed it. Cost per pole was about $25 including energy. They were located on about 100-ft. centers.

East Orange, N. J. Business District in Holiday Dress. The installation, which cost about $25 per pole, consists of 10-watt amber lamps in sockets attached to heavy wire frames. The star shape is supported by a wooden brace pole. Star and brace are attached to trolley wire supporting cable. The wooden brace is decorated with laurel.

Where there is a generous supply of snow during the Christmas season an unusual effect can be created by building small snow mounds, hollowing them out in the center and placing in each "crater" a colored lamp. If desired, a small opening can be made in the house side of the "volcano" and the escaping light will illuminate the street side of each volcano. The effect created is pleasingly different. Waterproof sockets should be used.

The Christmas season isn't so far distant—plans should be made now. The photographs show decorative suggestions that have been successfully used.

Recommended Standards for Store Lighting

After considerable research the following recommended foot-candle standards for illumination design have been compiled for stores. They

STANDARD FOOT-CANDLE VALVES FOR STORE LIGHTING

	General Interior Lighting	Show Case	Special Displays Inside Store			Show Window	Lighting to Reduce Daylight Window Reflections
			Light Colored	Medium Colored	Dark Colored		
Large Cities							
Brightly Lighted District	20	50–100	30–50	50–100	100 or more	200	200–1000
Secondary Business Locations	20	50–100	30–50	50–100	100 or more	100	200–1000
Neighborhood Stores	15	50–100	30–50	50–100	100 or more	50	200–1000
Medium Cities							
Brightly Lighted District	20	50–100	30–50	50–100	100 or more	100	200–1000
Neighborhood Stores	15	50–100	30–50	50–100	100 or more	50	200–1000
Small Cities and Towns	15	50–100	30–50	50–100	100 or more	50	200–1000

An Announcement

BY THE

RLM STANDARDS INSTITUTE

ADDRESSED TO THE ELECTRICAL CONTRACTING INDUSTRY

Members of
RLM STANDARDS INSTITUTE
Incorporated

RLM Standards Institute, is a non-profit organization, dedicated to the establishment and maintenance of quality standards in industrial lighting equipment.

ABOLITE REFLECTOR COMPANY
West Lafayette, Ohio

BENJAMIN ELECTRIC MFG. CO.
Des Plaines, Illinois

GOODRICH ELECTRIC COMPANY
Chicago, Illinois

THE MILLER COMPANY
Meriden, Connecticut

OVERBAGH AND AYRES MFG. CO.
Chicago, Illinois

QUADRANGLE MFG. COMPANY
Chicago, Illinois

WESTINGHOUSE ELECTRIC AND MFG. COMPANY
Cleveland, Ohio

WHEELER REFLECTOR COMPANY
Boston, Massachusetts

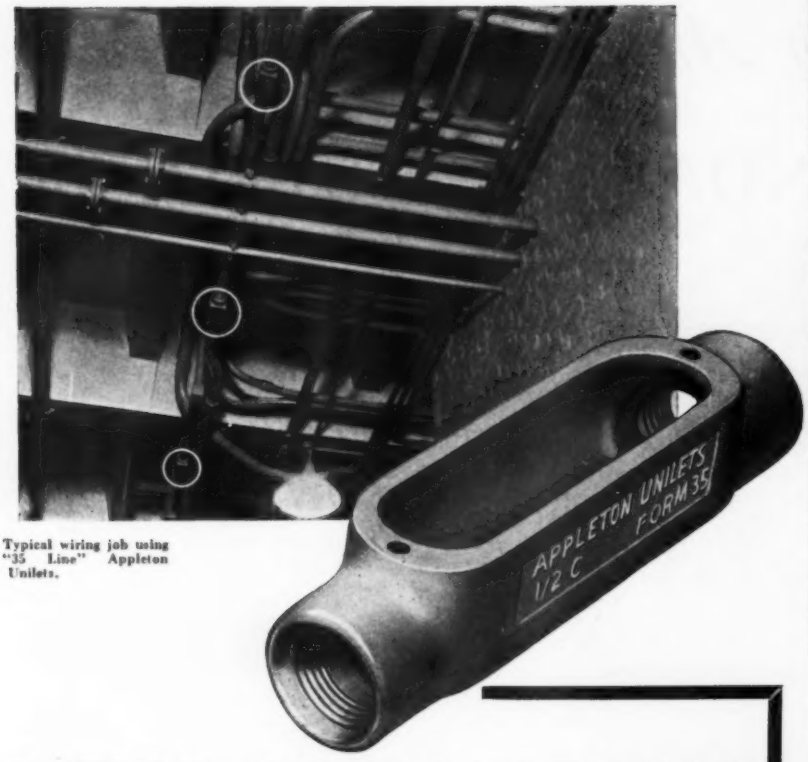
To establish *quality standards* for industrial lighting equipment and to provide the means whereby products conforming to these standards can be readily identified are the basic purposes which have prompted the formation of the RLM STANDARDS INSTITUTE.

These RLM *quality standards* are based upon the collective experience and study of industrial lighting problems by the Institute's membership. Embodied in these standards are quality of design, construction, composition, finish, performance and service.

Under the direction of the Institute, all products bearing the RLM label are subject to frequent inspection by an outstanding, unbiased, testing laboratory—The Electrical Testing Laboratories. It is the duty of this laboratory to call on the manufacturers without notice, secure RLM equipment as it comes off the production lines, inspect and test it for conformance to RLM Standards.

It is the Institute's aim to promote the installation of quality lighting equipment and to co-operate with the electrical contracting and other branches of the electrical industry in all activities directed towards increasing the adequacy of industrial and other lighting installations. Reflectors with the RLM label signify to your customers' *more and better light at no extra cost* and at the same time *identify you as one interested in quality installations.*

RLM STANDARDS INSTITUTE
INCORPORATED



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are said to be conservative when appraised on the basis of seeing, advertising, atmospheric and psychological effects. Recommendations for other fields will be given in succeeding issues.

Recommended Lighting Levels for Shoe Industry

The following table was included in a recent report on lighting in the shoe manufacturing industry as submitted before the thirtieth annual convention of the Illumination Engineering Society by the committee on industrial and school lighting:

Recommended Levels of Illumination for Shoe Industry

Leather Shoes	*Foot-Candles*
Storage and Sole Leather	
Leather Storage	10
Vamp Storage	10
Last Storage	10
Beam Dinkers	10
Miscellaneous Areas and Aisles	5
Cutting and Stitching	
Cutting Tables	10
Marking, Buttonholing, Skiving, Sorting, Vamping, Counting	
Light Material	20
Dark Material	40
Stitching—General	6–10
Light Material (Local)	20–50
Dark Material (Local)	50–75
Miscellaneous Areas	5
Office and Stock Room	10
Making Department	
Stitchers, Rough Rounders, Nailers, Sole Layers, Shank Nailers, Welt Beaters, Trimmers, Welt Scarfers, Welters, Tack Pullers, Lasters, Pull-Overs, Edge Setters, Edge Trimmers, Breasters, Sluggers, Levelers, Randers, Wheelers, Channel Layers	
Light Material	20
Dark Material	40
Sorting and Storage Areas	10
Miscellaneous Aisles, etc.	5
Finishing Department	
Treers	
Light Material	20
Dark Material	40
Embossing, Spraying, Cleaning, Scourers, Buffers, Polishers, Hand Repairers	
Light Material	20
Dark Material	40
Benches	20
Miscellaneous	5
Packing and Shipping Deepartment	
Box Making, Bench Work, Shipping Room	10
Office	15
Aisles and Miscellaneous	5
Rubber Shoes	
Coaters and Mill Run Compounding	10
Varnishing, Vulcanizing, Calenders, Coaters, Upper and Sole Cutting	35
Sole Rolling, Lining, Cutting and All Making	45
Office	15
Aisles, Miscellaneous	5

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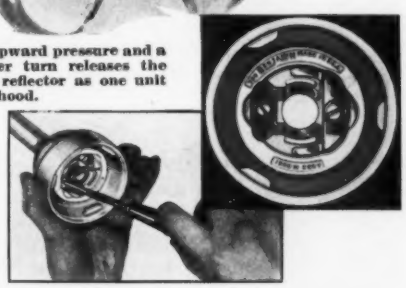
A slight upward pressure and a one quarter turn releases the lamp and reflector as one unit from the hood.



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Code Chats . . . . .

Questions and answers relating to the interpretation of the National Electrical Code . . .

Conducted by F. N. M. Squires

Chief Inspector New York Board of Fire Underwriters

Metal Raceway Through Floors

Rule 504-e permits metal raceways to be extended through dry floor if in unbroken lengths. I should think that when passing through floors the raceway would be subject to mechanical injury, and would require conduit.

Field experience has shown that metal raceways may safely be extended through dry floors, walls and partitions and the Code has, therefore, recognized such usage.

There shall, of course, be no butt or end of the raceway, or backing, or capping within the wall, floor, or partition.

Single Pole Switch in Neutral

What is the principal reason for not allowing in 1204-a a single pole switch cut in on a grounded wire?

A switch in the grounded wire of a circuit only would leave the device controlled connected to the live wire at all times. This would be hazardous for anyone desiring to work on the device.

Bonding Fittings for Over 150 Volts to Ground

According to Section 904-d a system of over 150 volts to ground shall be grounded in one of four methods. Is a single-phase system of 220 volts between conductors considered over 150 volts to ground, necessitating the use of double locknuts or other improved method?

The definition in Section 1 of the Code for "voltage to ground" reads: "* * * in ungrounded circuits the greatest voltage between the given conductor and any other conductor." Therefore in a 2-wire single-phase system of 220 volts between conductors, the "voltage to ground" is 220 volts and the single locknut and bushing is not considered sufficient to comply with the provisions of 904. The double locknuts, one inside and one outside, as mentioned in Paragraph 4 of 904-d, or No. 1, 2, 3, or 5 would be required.

Interconnection of Auxiliary Plant

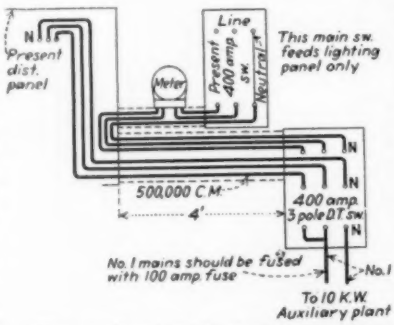
You will find enclosed a diagram providing for the addition of a 10 K.W. auxiliary plant to the present system. The estimated load under which the auxiliary plant would be used is less than 100 amp. This system would be used for lights only as there is a separate power service which would not be incorporated in this system.

Is it permissible to feed this system from a 2-wire 110-V. auxiliary plant?

Would it be possible to use a common neutral and a 2-pole double throw switch instead of a 3-pole?

According to the Code it is necessary to use a 4½-in. conduit to enclose six 500,000-cm. conductors. As the distance is only 4 ft., could a smaller conduit be used?

How should the auxiliary plant be grounded?



The estimated load at the time while the auxiliary plant is in use, is 100 amp. and the generator capacity is 100 amp., so, if there is over current protection (fuse or circuit breaker), provided to protect the generator and its feed to the double throw switch, there could be no objection. For this 100-amp. protection, there should be a 100-amp. fuse provided in the lead marked X but not in lead marked N, which should be grounded.

If the street supply is A.C., a 2-pole double throw switch could be used, in which case, the grounded wire of the generator would be connected through solidly to the neutral of the street supply in the double throw switch box. The neutral of the street supply must be carried in the same conduit with the other wires between "present distribution panel" and the double throw switch box; otherwise, induction is apt to be encountered.

If the outside supply is D.C., then a 3-pole double throw switch must be used as with an unswitched neutral the auxiliary plant ground would place an extra ground on the street neutral which is not permitted by 902a.

The Code makes no allowance for a reduction of the size of the conduit required for six 500,000-cm. cables, 4½-in. conduit should be used even for the 4-ft. run.

The wire N of the generator should be grounded at the generator to a water pipe.

Size of Service Entrance Neutral

"In reading your section entitled 'Code Chats' appearing in the September issue of ELECTRICAL CONTRACTING, *I find that you do not recommend the use of a reduced sized bare neutral for service entrance conductors.*

The use of neutral grounded conductors two A.W.G. sizes smaller than the ungrounded conductor is becoming quite common in this country and is permitted under the 1935 Code. This is particularly true of service entrance cable, Type SE. The Underwriters' Laboratories permit the labelling of two and three wire assemblies where the bare grounded conductor is two A.W.G. sizes smaller than the ungrounded conductor, provided the grounded conductor is not smaller than No. 8 A.W.G.

Before approving Service Entrance cables with reduced sized bare grounded conductors, the Underwriters' Laboratories conducted current loading tests to determine the resultant temperatures obtained by passing the full rated current, for the given size of bare wire involved, through the conductor. These tests indicated that the resultant temperature did not equal the maximum temperature for rubber insulation, which is 49.5 deg. C.

While the specific question in the September Chat did not involve the question of service entrance cable, I

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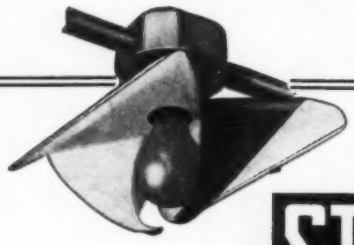

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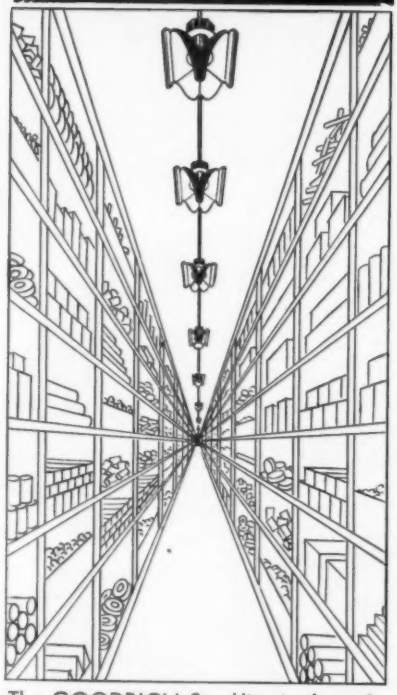

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believe that the inference may be drawn that, this would apply to service entrance cable. The fact that all service entrance cable bears Underwriters' labels would naturally create a question in the purchasers' mind as to the soundness of the decision of the Underwriters' Laboratories to list this type of assembly.

In the item entitled "Use of Different Insulations," in the September issue, we assumed that the question covered the use of rubber covered and bare wire in conduit. Our above correspondent is arguing from the standpoint of service entrance cable and we agree with him with the exception of the last part of the first sentence, in his second paragraph.

While his statement that the use of a neutral conductor two wire sizes smaller than the ungrounded wires is permitted by the Code, might be a possible interpretation of the Code, we maintain that the Code does not specifically so state the matter.

We understand that the Laboratories did conduct tests as stated and that they found that the so-called "bare neutral" conductor of a service entrance cable two sizes smaller than the rubber insulated wires, did not develop as high a temperature as the insulated wires. It was found, for instance, that with two or three No. 6 insulated wires and one No. 8 (for the "bare" neutral) and each wire carrying its normal capacity of 50 amp., the No. 8 wire, being nearer the outside of the cable and the heat being more easily radiated by the lack of the rubber insulation, ran cooler than the No. 6 wires. We still maintain, however, that for a conduit installation our September Code Chat was correct.

Grounding to Sprinkler Piping

Can I use the sprinkler pipes as a ground, or must I run all ground wires from conduit systems and motors to water pipes? Did you ever know of a ground on a sprinkler pipe that opened a sprinkler head?

The Code requires the use of "an underground water piping system" for use as a grounding medium when such a system is available. While many sprinkler systems are connected directly to street water mains, others are not so connected. Some are fed from a wooden storage tank on the roof of a building, which tank may, of course, be supplied from the street mains but which tank insulates the sprinkler pipes from the street water mains. Then again, while the sprinkler pipes in a build-

A Pointer
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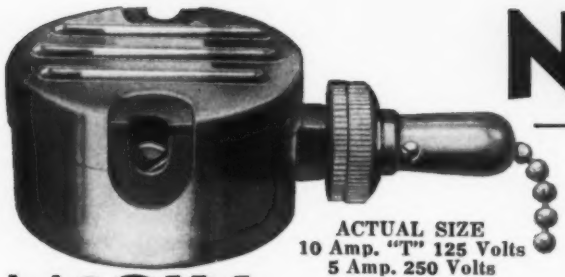

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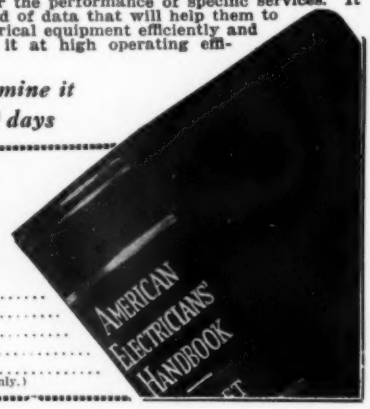

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ing may be at present connected to the street water mains and thus afford a good grounding medium, the building might at some time in the future become an unsprinkled risk and, therefore, have the sprinkler system entirely disconnected from the water mains.

The editor of this column knows of no case where a ground on the sprinkler system has opened a sprinkler head.

Field Lighting

For the lighting of a football field there are four 1500-watt flood light units on each pole, which is 6,000 watts to the pole. There are ten poles—five on each side. The total load is 60,000 watts. We have two 2300-volt oil circuit breakers, each controlling 30,000 watts. We leave the oil circuit breakers with 2300-volt lead cable underground to a 2300-volt 220-110 volt transformer on the middle pole, then run three No. 4's to supply the five poles.

Section 2008, Heavy Duty Lamp Branch Circuit, would require us to fuse each branch circuit not to exceed 4000 watts. How can we eliminate fusing on each separate pole?

As stated by our correspondent, the total load on the five poles on each side of the field is 30,000 watts at 220 volts, or 6000 watts per pole. Since Rule 2008a, 3, prohibits the connection of more than 4000 watts on one heavy duty lamp branch circuit, each pole should be supplied by a 3-wire circuit, inasmuch as the transformer secondary is three-wire, 110-220 volts. This 3-wire circuit furnishes the equivalent of two circuits, each of which can be 3000 watts.

It would meet the Code requirements to lay out the lighting system each side of the field as follows:

From the transformer secondary run three No. 00 (to carry 30,000 watts at 220 volts) to a fuse panel, which panel will contain ten 35-amp. fuses for the protection of five 3-wire circuits. The neutrals, will, of course, be solid. From each pair of fuses (across the 220 volts and with the neutral), run three No. 8 wires to the lamp holders on each pole.

Thus each circuit or each side of each 3-wire circuit, will be loaded to but 3000 watts, which is within the requirements of the Code. The entire group of lamps on each side of the field may be controlled by a single 2-pole, 220-V, or a 3-pole, 110-220-V, switch. Of course the oil circuit breakers mentioned can be used as the control switch.

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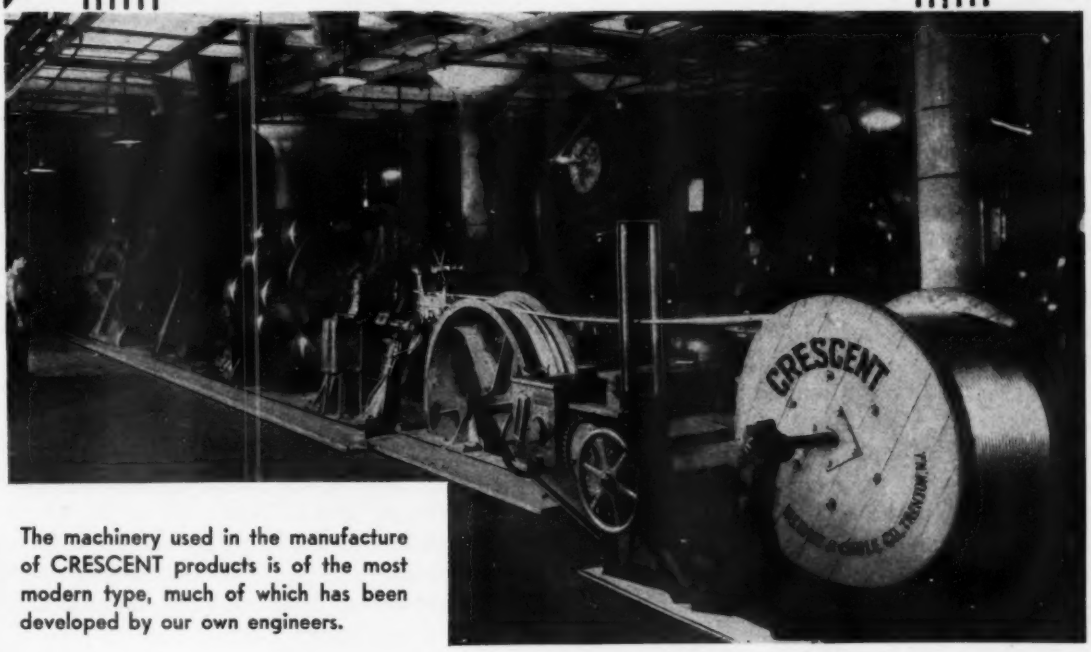

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ELECTRICAL CONTRACTING

S. B. WILLIAMS, Editor

To Promote Adequate Wiring

ONE of the most important bits of news of interest to the electrical contractor is the announcement that the National Electrical Manufacturers Association has approved a budget of $50,000 for the promotion of adequate wiring. This is the first time that a fund has been available nationally for this purpose.

Since the budget has only just been approved, it is too early to state just how this activity is to be carried out other than to say that it will be aimed at new house wiring. This probably is the one field in which most can be accomplished quickly and by attacking this field first, it will probably be found that, as a by-product, a demand will have been created in the already built house for better wiring.

Moreover, the resistance which inadequate wiring offers to the sale of appliances has made it necessary that something be done promptly to correct the situation.

Whatever form the activity takes the electrical contractors, whether engaged in house wiring or not, should give it their fullest cooperation. This is but the first step and its success will give encouragement to its sponsors to take on other fields of adequate wiring promotion.

A Fine Convention

FOR interest, attendance, smoothness and entertainment, the 1936 N.E.C.A. convention held in Atlanta last month was one of the best the Association has ever held. There was no startling feature to stir up the delegates. It was just the attention of a large number of men who were earnestly interested in the Association and its activities.

In many conventions the first session has been crowded and the remaining sessions slimly attended. This year all sessions were well attended. The discussion was spontaneous and constructive.

The entertainment program also was of a high order and so well organized was it that there was not the slightest confusion. The Atlanta committee is to be complimented on its efforts. Incidentally, this committee broke all precedent by raising the convention fund entirely within the electrical contracting industry. Taken in conjunction with the remarks of several speakers that the Association must support its activities without outside financial assistance of any kind, it would seem to mark a new milestone in contractor association affairs. Such action can only serve to create greater respect on the part of the rest of the industry for the Association.

The N.E.C.A. is now on the way back. A new basis for dues should solve the financial problem which has been worrying the officers of that body for some time. With ample income, the Association will be able to undertake more activities and provide more frequent contact between the officers and the members.

All in all the 1936 convention seemed to mark a definite turning point in the affairs of the Association with a vastly improved prospect for the future.

Better Trade Relations

IT WAS only a few years ago that electrical contractors and dealers were going to their state legislatures asking for laws that would prohibit power companies from selling appliances to their customers. In fact such legislation was enacted in two states.

Now all of that has changed. There is a rapidly increasing spirit of cooperation between the utilities and the contractors. What has brought this all about? Is it permanent?

Some of the improvement can be laid to the depression which forced many contractors to give more attention to their store business with the result that their sales improved. The utilities seeing that the local dealers could handle the sales have, in many instances, withdrawn from merchandising.

The lack of business during the last few years also made the utility wiring business more attractive to the contractors than it would be when business was good. Range wiring, outdoor meter setting, etc., looked good even to some of the larger contractors.

And also the contractors and utilities have much in common. They are members of the electrical industry, both interested in advancing the use of electricity along the right lines. Other dealers might sell, in some instances, a larger volume of appliances but their interest is entirely one of stock turnover. They have no interest in pioneering, in standards, or the growth of the electrical industry.

While industry trade relations are not perfect, they are so much improved over what they were four or five years ago and the results are so evident that it augurs well for a steady improvement.

Public Interest in Legislation

A NEW approach to state electrical wiring legislation is being tried out in Ohio that is eminently sound. Instead of writing their own bill and striving with all their might to get it passed, the Ohio Electrical Contractors Association at an open meeting last month presented their program to everyone who might be affected. Thus the other branches of the industry, as well as the public represented by the construction, utility management and real estate interests, have been given an opportunity to express themselves and have a part in the drafting of the legislation.

How much more practical such a procedure is than the method of going it alone. By this procedure, such compromises as may be necessary are made by mutual agreement beforehand without the bad publicity that comes from a heated legislative fight. Moreover, this way is much quicker and far less expensive.

Far too frequently contractors have believed that such state legislation was enacted for their benefit and they have approached the matter with exactly that point of view. As a matter of fact the theory of such legislation fundamentally is the protection of the public.

Furthermore, the protection of the public must be reasonable and not burdensome. It is so easy for the public to look with suspicion on any legislation advanced by special interests as being aimed at the pocketbook of the consumer.

It is only reasonable, therefore, that the public should be brought into the program before a bill is drafted. The chances for speedy passage with the minimum amount of compromise is much better. Incidentally, when the public is invited to confer on such a program, it is much less suspicious and much more inclined to compromise its views than when faced with a battle before a legislative committee.

And what has been said of state legislation applies with equal force to city ordinances. Many an ordinance has been fought by outside interests to the detriment of the contractors when early consultation with these interests might have produced an excellent ordinance as well as created a fine spirit of public good will towards the contractors.

Cost of Violations

WHAT is the cost of Code violations? Some interesting figures were presented to the N.E.C.A. convention last month by George Andrae of Milwaukee, Wis., which showed that out of 7371 electrical permits issued in Milwaukee last year, 4227 or 57 per cent received violation notices. On the minimum basis of two dollars average per job for labor, material and mileage, the cost comes close to $10,000.

It so happens that Milwaukee has tried to have a high standard of Code education. What are the figures in other places where the standard is lower? It would be interesting to get similar figures from other cities if for no other reason than to demonstrate, first, the need for careful inspection and, second, the need for closer study of the Code by contractors.

In Louisville, where a round table on Code problems has been going on for years, the contractors pride themselves on their knowledge and understanding of the Code. Other cities might experience the same kind of interest with the right leadership. It is worth trying. It will build up the character of workmanship, reduce incompetent competition and generally save the contractors money now lost on violation corrections.

Volume Extended

THE present volume, No. 35, of **Electrical Contracting,** instead of closing with the October issue as customary, will be extended to include the November and December issues. Volume 36 will start with the January issue and continue on a calendar year basis.

The practice of starting a new volume with the November issue dates back to the first issue of the magazine in November 1901 as the **National Electrical Contractor** and, through the successive changes in name and ownership it has maintained that volume sequence up to now.

UMI

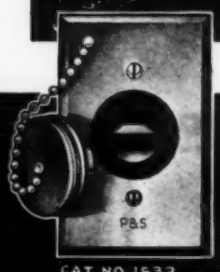
P&S Decorative LIGHTING MATERIALS

P&S Ready-wired Streamers and Pin Type Sockets are two profitable items for decorative lighting work. P&S 5320 type Ready-wired Streamers are equipped with brown bakelite weatherproof sockets—supplied in any length up to 500 feet—with any spacing of sockets desired. Completely wired—ready for immediate use. Suitable for either indoor or outdoor installation.

Cat. No. 5464 bakelite socket for temporary work is designed so stripping, soldering, or taping of wires is not necessary. Sharp pointed terminal pins pierce insulation and make positive contact with wire. Socket cap screws onto body, holding wires securely in place.

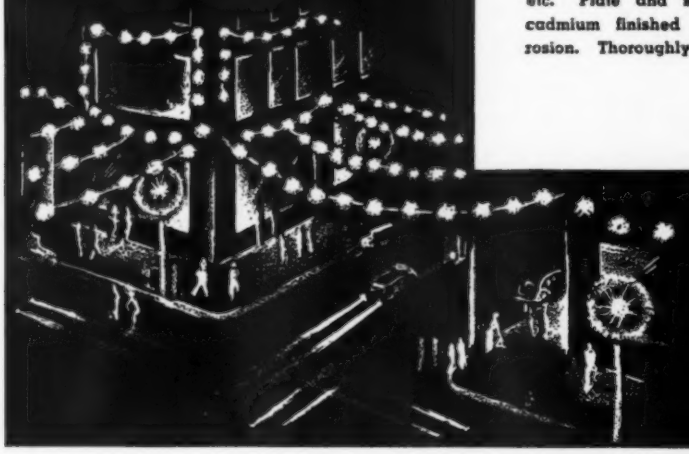
Your request for bulletin 1995-C will bring complete listings and data—write for it today.

PASS & SEYMOUR, Inc.
Syracuse, N. Y.



CAT. NO. 1533

• Outdoor Flush Receptacle for holiday lighting, portable appliances, etc. Plate and screw cover are cadmium finished to prevent corrosion. Thoroughly weatherproof



Contracting . . . . News . . . . . .

Appropriates $50,000 for Adequate Wiring Promotion

National promotion of adequate residential wiring is now assured through the approval by the National Electrical Manufacturers Association in its budget of an appropriation of approximately $50,000 for this purpose. To provide a plan of organization for this promotional activity a committee will shortly be set up.

It is the intention of NEMA to seek the cooperation of the other branches of the industry in the preparation of a comprehensive national plan of promotion so that the plan, when approved, can receive the support of all interests.

No Walsh-Healey Act Difficulty on Construction Material

While the construction industry generally has not come under the provisions of the Walsh-Healey Act because it furnishes a service, there has been some question about the materials purchased by the contractor for use on the job. Without admitting that the Walsh-Healey Act does not cover materials entering into products furnished on government contracts, Labor Department officials have no idea at present of making an issue on that score. An amendment that would make this clear and would preclude use of materials made under sweatshop conditions will be sought by the American Federation of Labor.

Wiring Handbook Ready by January

Printed copies of the Handbook of Interior Wiring Design, now under preparation by the Industry Committee, will be available this coming January, it is expected by E. A. Brand, committee chairman.

The committee, meeting in New York, N. Y., September 11, reviewed and approved the complete text of the book as submitted and is now taking steps to secure approval of sponsor organizations so that printing may get under way promptly. Cooperating associations have already made definite commitments for 7,000 copies of the Handbook.

The question of publicizing and promoting the Handbook as an all-industry document received the committee's serious consideration at the New York meeting. It was decided to form a publicity sub-committee drawn from all branches of the industry to prepare plans and a program covering both national and local promotion to put the Handbook in general use in the electrical industry as well as the architectural profession and building trades.

Court Rules Plumbers' Re-examination Law Void

A recent decision rendered by the New York Supreme Court declared as unconstitutional a law passed to empower the Commissioner of Health and others to conduct examinations of plumbers seeking to renew their licenses in Greater New York. The law in question was an amendment to the New York City Charter provisions for licensing plumbers, which requires that all who secured licenses since January 1, 1920, may be compelled to take an examination, and is said to have affected about 4,700 of the 5,200 master plumbers in Greater New York.

The opinion of Supreme Court Justice McGoldrick held this law to be discriminatory, and to be born of the claim that some licenses had been obtained by fraud. The court recommended the situation be corrected by proceedings for revocation of such licenses as were asserted to have been obtained fraudulently. The license held by a plumber upon whose suit this decision was made was ruled to be "a vested property of which he should not be deprived without due process of law".

PROVIDES FOR DRIVE-IN CUSTOMERS: Parking problems are not allowed to handicap customers of the Terrell Electric Co., Chattanooga, Tenn. Its quarters are set back from the sidewalk so several cars may be driven in from a busy street while an order is left for that new range, water heater, lamp, or perhaps some additional wiring. Employees, deliverymen, and salesmen are not permitted to use this space for routine parking.

Electric Committee Defers Action on Grounding Protest

The National Association of Master Plumbers recently submitted a resolution to the N.F.P.A. for the purpose of again bringing attention to its previously announced objection to the use of plumbing or gas pipes for neutral ground connections. The resolution requested the discontinuance of such practice until a definite report on such practice could be received from the American Research Committee on grounding. Because the foregoing committee has among its members certain members of the Electrical Committee, Chairman A. R. Small of the Electrical Committee has pronounced a view that no other and no immediate action is required of his committee.

Fire Marshals to Confer on Farm Wiring Hazards

A conference of middle Western state fire marshals will be held in Chicago on December 3 under the auspices of the National Fire Protective Association for the purpose of discussing increasing hazards from rural electrification in areas where there is no provision for inspection.

The subject of adequate state legislation is expected to come up and in that connection the operation of the Michigan law will be described.

Building Labor to Want Larger Share of Profits

Labor is certain to become increasingly aggressive in the struggle for a larger share of the profits of business, in the opinion of Dr. John A. Lapp, newly appointed umpire of building trades jurisdictional disputes. His thought was expressed in the course of remarks before the Washington Society of Engineers.

Labor also is certain to insist, he said upon a portion of the profits flowing from the use of machinery or improved processes. This is why the cement finishers, for instance, demand increased pay when accelerators are used and refuse to allow more than one shift except on an overtime basis. By one means or another, he said, labor is striving to get a larger division of employer income, but he pointed out, it has learned that the employer has no pot of gold and management has learned that it is only natural for the

NO. 110 "LATROBE" WATERTIGHT BOX

Cut-away view, showing how the tapered unit receptacle fits tapered opening in top of box body.

INSTALL "Latrobe" FLOOR BOXES AND WIRING SPECIALTIES

With building booming and skilled labor at a premium in many sections, the economy of Latrobe grows increasingly evident.

Install the compact, time-saving line—your customers will appreciate the quality and you'll save money.

NO. 130 "LATROBE" ADJUSTABLE WATERTIGHT FLOOR BOX

No. 130 Box with No. 207 Bell Nozzle. Cut-away view illustrates how tapered unit receptacle fits tapered opening in adjustable ring. Design eliminates many small parts. Cover plate 3½"—overall height 3⅛".

NO. 252-R TWO GANG BOX

Two gang Adjustable Floor Box with No. 208 Receptacle in one section. One cover plate with ½" Flush Brass Plug and the other cover plate with 2" Flush Brass Plug.

FULLMAN MFG. CO.

LATROBE PENNA.

men to try to better their economic status. As unions grow stronger and become better disciplined he predicts that negotiations will become more orderly. Strikes were accompanied by more violence when labor was unorganized or only partly organized, Dr. Lapp asserted. He said there is little excuse for employers being unable to understand labor as practically all of them are employees who have been promoted.

Dr. Lapp declared that he cannot understand all the fuss and civil war that has been stirred up over industrial and craft form of organization. He said there is plenty of room for each. He predicted that there would be no effort to organize the building trades on an industrial basis as those unions are well entrenched. He stated that jurisdictional disputes are not frivolous, as a rule, despite the unimportance of a particular difference. The building trades came in for much ridicule, he said, when work on the new Labor Building was delayed a hundred separate times by quarrels over jurisdiction. The inmediate job may be unimportant but the precedent may run into millions of dollars in wages in the long run. He said the unions as never before recognize that the need of the situation is to provide for quick decisions and their acceptance in sportsmanlike manner.

Seattle Chapter Elects New Officers

The Seattle Chapter, N.E.C.A., at the annual meeting held on September 24, elected the following officers: L. J. Benedetti, president; S. G. Hepler, vice-president; O. A. Carlson, secretary-treasurer; and J. J. Agutter, Grover C. Burke, and H. M. Sayers, trustees.

Inspectors Publish Booklet on Home Safety

The Public Relations Committee of the International Association of Electrical Inspectors has recently published a booklet intended to advise householders how to use their electrical equipment safely. The Inspectors feel that the application of the National Electrical Code, the use of approved materials and the services of the inspection departments combine to insure reasonable safety for the permanent electrical installation of a house, but realize that these precautions frequently are nullified soon after the occupants move in. Sometimes through carelessness, but more often through ignorance, householders bring in non-standard and hazardous equipment, fail to keep appliances in proper repair, devise makeshift extensions and make unskilled repairs.

The inspectors believe that most of the trouble lies in a lack of knowledge on the part of the public in the funda-

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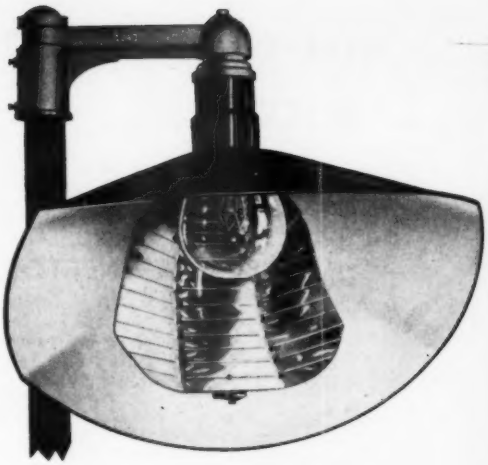

No. 694JL shown above has long beam projector of ALZAK Aluminum.
Medium beam projector is ANODIC process aluminum.
Diffusing type has the white porcelain enameled reflector only.

690 SERIES

NEW BIG SIZE

OPEN TYPE

FLOODLIGHTS

FOR LIGHTING

LARGE AREAS

The "SIX-NINETY" Series of Floodlights

This new series of larger Quad Floodlights was designed for 750, 1000 and 1500 watt lamps only. The reflector size is 19½" x26½".

The light distribution and mechanical features are in general like the smaller and very popular "Six-Eighty" line recently amplified to include multiple mounting of the enclosed wiring type.

The outstanding difference is that the reflectors are greatly increased in size and have a somewhat wider light cutoff angle in the horizontal plane.

ANOTHER

QUAD LIGHTING UNITS

SALESMAKER

Quadrangle again places a bigger and better sales opportunity in your hands. The new "Six-Ninety" Series increases your market and the fact that it is a Quad Lighting Unit is proof enough that it is correct in design, made right, and built to serve satisfactorily. "Six-Ninety" Series is an example of our efforts to work for you and with you so that you can meet all lighting needs and make money. The "Six-Ninety" Series is a true achievement in lighting—get acquainted with these units—put them to work—we suggest that you write us for complete details now.

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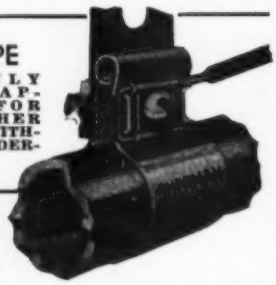
GROUND CLAMPS

SL TYPE

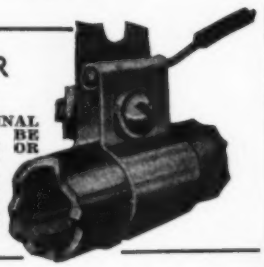
THE ONLY CLAMP APPROVED FOR USE EITHER WITH OR WITHOUT SOLDERING.



ALL COPPER ONE PIECE
U. S. Patent No. 1241808

SOLDER TYPE

THE ORIGINAL TYPE—CAN BE USED WITH OR WITHOUT SOLDERING BUT APPROVED FOR SOLDERING ONLY



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BATTLE CREEK MICHIGAN

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50 AMPERE
Synchronous
TIME SWITCH
. . . dependable
. . . at low cost

Here is a time switch that you can depend upon to give absolutely satisfactory service.

Sell quality and eliminate costly service calls.

See your wholesaler or write for complete descriptive literature.

RELIANCE AUTOMATIC LIGHTING CO
1937 Mead Street Racine, Wis.

mental principles of electrical safety, and have prepared this booklet as their contribution to the cause of safer and more satisfying use of electricity.

When the booklet was being prepared it was hoped that school teachers would be glad to have this kind of information for use in their classes, and requests from this source have been so numerous as a result of the first mailing that the committee has realized that from a financial point of view, it will be impossible to meet the demand. It is intended, however, to place a large order to obtain a low unit price and then offer the booklet to interested groups at cost.

Harry B. Kirkland

Harry Behrens Kirkland died in New York on October 10, in his sixty-seventh year. Few men in the industry had as wide an acquaintanceship or as many friends as he.

While the greater part of his business life was spent in the manufacturing field, he entered the electrical industry as a wireman's helper in 1887.

Harry B. Kirkland

When he was twenty-five, he was general commercial representative of the American Circular Loom Company, later becoming associated successively with the National Metal Molding Company, the American Conduit Company, the Sprague Electric Works and then the Wiremold Company of which he was vice-president and sales manager.

Some ten years ago, he left the commercial field to promote uniform local electrical legislation. He became head of the Uniform Legislation department of the Society for Electrical Development and, when that work was transferred to NEMA in 1931, he continued to direct it. When ill health forced him to give up that work in 1935, he was appointed assistant to managing director of NEMA.

In the promotion of uniform legislation, Mr. Kirkland directed the compila-

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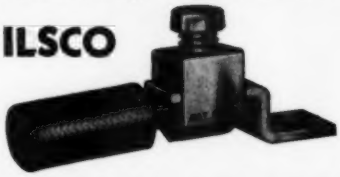
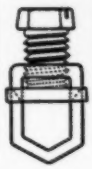
ILSCO



SOLDERLESS CONNECTOR

NOTICE: The ***triangular wedge*** formed by the tang and V-bottom collar, which forces the wire into a ***solid mesh***—



NO set-screw contact . . .
NO flattening or separating of wires . . .
NO limitation to one size wire . .
NO shearing effect whatsoever . .
NO special tools required to make connection . . .

NO need for you to search any longer for the PERFECT Solderless Connector—WE HAVE IT!

Ilsco solder lugs show the size of the largest wire they will take.

FREE—A large display board, containing mounted samples of ILSCO lugs. Sent upon request.

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Save time and money when buying!

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Use your copy of the Buyers Reference Number of Electrical Contracting to find out

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You FURNISH THE JOB We

HAVE THE MOTOR TO DO IT!

● Difficult or exacting drive problems to face? Motors to meet unusual torque or starting conditions? Planning power for new equipment still in the paper stage?

Then call the man from Fairbanks-Morse!

For he is not limited in his specifications to a few motors, one of which he must choose to do a given job. In his complete line, he has both a wide range of types, and many graduated sizes and ratings within each group. In any motor he specifies, you are assured of extra performance and extra values beyond the formal specifications—for his motors have such features as sealed-in ball bearings. Measured grease tube lubrication. Dynamically balanced rotors. Sealed-in leads. Advanced core construction, insulation, and group-wound coils.

For full information, address Dept. N-421, Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. 34 branches at your service throughout the United States.

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POWER, PUMPING AND WEIGHING EQUIPMENT

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The **MARR**
A Perfect Joint Connector
(CAP MADE OF BAKELITE)

—20 SECONDS—

—AND THE JOB—

—IS COMPLETED!

Two simple operations and the connection is made—twist wires in connector and set down screw — slip over Bakelite insulation and screw down tight.

Marr Connectors are also obtainable in porcelain. Underwriters' Approved.

Write for Samples

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General Sales Agents
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220 Church Street, New York, N. Y., U. S. A.

tion of the Uniform Electrical Ordinance and the creation of a vast amount of information on local ordinances. His duties took him into almost every corner of the country and he was able in a large number of instances to help local communities secure proper legislation.

His work also brought him in close contact with the International Association of Electrical Inspectors and for his cooperation he was made an honorary member for life.

Many hundreds of other people in the industry will remember Harry Kirkland for the warmth of his friendship, his sociability and his ready response to any appeal for help.

John A. Wahlgren

John A. Wahlgren, vice-president of the Habirshaw Cable & Wire Corporation, died suddenly of a heart attack on October 11. Before joining the Habirshaw corporation, Mr. Wahlgren was sales manager of the Insulated Wire Division of the U. S. Rubber Products Corporation. He was chairman of the preliminary planning committee of the NEMA adequate wiring program, and also chairman of other committees in that organization.

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Cable or Conduit Hanger
Jiffy Clip

Now furnished in EVERDUR as well as Cadmium Plated Steel.

Cable or Conduit Hanger
Rigid Conduit—⅜"—2½"
Thin Wall—½"—1½"

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E. M. T. (Thin Wall) ½" & ¾"
Also BX Cable

Ask your Jobber

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THE BEST TAPE MADE

YOUR JOBBER HAS IT

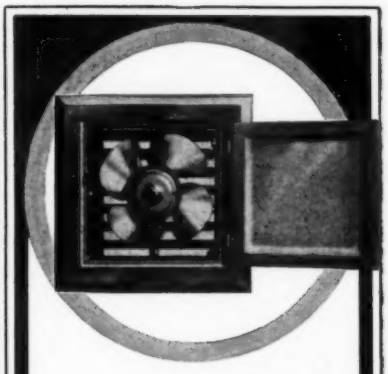
A Roll o' Tape

Field notes about men of the contracting shop, and inspection branches of the industry

---

AFTER receiving a wiring contract in midafternoon, 165 men were placed on the job by the following morning by the Walker Electrical Co. of Atlanta, Ga.

CHAIN store lighting loads sometimes amount to only half the total load, in the experience of P. P. Hebert of the Seastrunk Electric Co., Columbia, S. C. A $1,200 store rewiring job that was recently completed by this company followed "patch" jobs that had been done five times in this store during the past ten years by others. None of these jobs were adequate to care for



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Built-in type for permanent installation, it is telescopic in design, adjustable to wall thickness 7" to 13". No wood or metal frame or screws in the plaster, wood, or brick necessary. Inside and outside polished cast aluminum; wall box rust resisting steel. Quickly installed in old or new homes. Automatic switch and shutters controlled by opening and closing of the door. 10" silent blade fan; available for A.C. or D.C.; A.C. non-radio interfering. Write for bulletin and prices.

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. . . for your copy of this FREE Book on wiring the Robertson Cellular Steel Floor!

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This book describes clearly and in detail the methods of wiring buildings in which the Robertson Steel Floor is used. It contains complete information on the Robertson Floor, on how to take advantage of its electrical facilities. Engineering data. Layout data. Installation data. Everything about wiring the Robertson Floor that you want to know. Mail the coupon . . . today.

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Please send me, without obligation, your new book entitled "Wiring Robertson Cellular Steel Floor."

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counters, cases, and demonstration outlets, the capacities usually having been limited in the past to main fixture wattages.

LETTERHEADS of the Edward J. White Co., Newark, N. J., carry the reminder "Modernize . . . . Obsolete Wiring Is Hazardous. May we Inspect and Advise You?" This timely suggestion is printed on the lower left-hand corner in neatly chosen type.

LOOKING ahead for future shop mechanics, William B. Jordan of the Columbia (S. C.) Electric Repair Co. employs two high school students who work at off-time and during their vacations as service shop apprentices.

A 15-ft. by 18-ft. model house that was built in the display quarters of the W. M. Smith Electric Co., Dallas, Tex., for the demonstration of room air conditioners has not been a wasted effort, even though this line of equipment has been given up. The house is just right for installing a model attic cooling system, and the salesmen who work that specialty will have their desks inside.

TAKING good care of a customer on a ticklish job still pays big dividends. A $20,000 broadcasting studio installation at Oklahoma City, Okla., by McEldowney & Son brought a repeat order for a similar installation in Denver, Col.

AN attractive display of industrial control, power transmission equipment and motors was arranged to screen the shop section from the view of passers-by at the E. L. Engasser plant in Union City, N. J. Heavy display boards, and sturdy motor and equipment racks are neatly finished in grey enamel, with black trim.

SOLDERLESS connectors recently proved their practical value to E. B. Alrich, Alrich Electric Co., of Augusta, Ga., while wiring a football field at Jessup, Ga. With forty 1500-watt floods atop 60-ft. poles to be spliced to open spans of weatherproof wires, pole-top soldering would have presented a problem.

STEADY improvement of shop layout and equipment has made it possible for J. W. Wilson, Macon, Ga., to produce as much motor work with a 3-man force as was possible several years ago with five men.

SUGGESTIONS pay dividends at the S. J. O'Brien Sales Corp. of New York, N. Y. Any member of this organization's 200 employees is paid one

CUT WIRING COSTS

Get More Jobs at More Profit

IDEAL

Solderless-Tapeless

WIRE CONNECTORS

Speeds work, cuts costs but makes neater joints, better electrically, stronger mechanically. Convenient to use. Cleaner, too—no burns on insulations, walls or ceilings. Ends the hazards of the open-flame torch. Make joints in cramped and hard-to-reach places. Just thread on, and there's a joint that you can forget. Sizes for all wire combinations. Fully approved. Listed by Underwriters' Laboratories.

IDEAL COMMUTATOR DRESSER CO.

1041 Park Ave. SYCAMORE, ILLINOIS

For

Residence Wiring

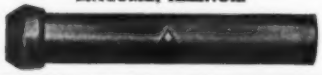
The Best and Safest Method is a properly installed KNOB and TUBE job. Be sure and get the

TRADE MARK Bull Dog REGISTERED

Assembled Knob because it "HAS A GRIP LIKE ITS NAMESAKE."

ILLINOIS ELECTRIC PORCELAIN CO.

MACOMB, ILLINOIS

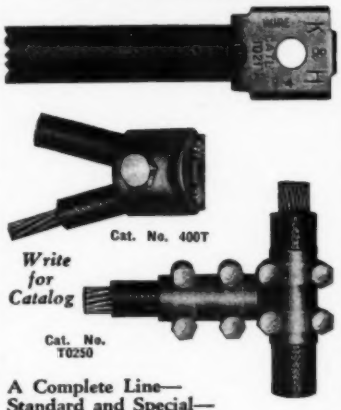


K&H

Solderless Terminal

LUGS

and Connectors



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A Complete Line—Standard and Special—For All Applications

KRUEGER & HUDEPOHL

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"Standardize on **STANDARD** *Transformers"*

ALL TYPES Indoor and Outdoor Service

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Warren - - - - - - - Ohio

CLOCK controlled SWITCHES

Ask Headquarters

The TORK CLOCK COMPANY, Inc.

Mount Vernon, New York

TRICO

REG. U S. PAT. OFF.

THESE TWO LITTLE DEVILS

BOY AM I SICK! I CAN'T HOLD OUT MUCH LONGER

DIG BIG HOLES IN YOUR PROFIT

BAD CLIPS AND FAULTY FUSES

Here you have the two primary causes of wasted millions of dollars in burnt fuses, clips, ruined material and equipment, plus enormous loss in production caused by unnecessary blowing of fuses and tremendous waste of current due to excessive heating. "Doubling up" fuse links in a frantic effort to cure the situation only increases fire and accident hazards. Switching from one fuse to another is adding expense unless you switch to a *different* fuse—a fuse with a *powder-packed* element. And you surely cannot eliminate trouble by installing mechanical devices with a multitude of delicate parts.

THERE IS ONLY ONE REMEDY GUARANTEED TO GIVE QUICK AND SATISFACTORY RESULTS— INSTALL

AND WE FEEL FINE— NO JOB IS TOO TOUGH FOR US

TRICO FUSES and KLIPLOK CLAMPS

TRICO Fuses were expressly designed to accommodate only the correct TRICO Renewal Element with a superior time-lag that only powder-packed elements can give. "Foreign links" cannot be used. It is this *non-interchangeable tamper-proof* feature that assures safe and dependable protection year after year.

KLIPLOK Clamps should be installed on new and old equipment as quickly as possible. They literally bolt the parts together. You can feel the destroying temperature disappear a few moments after they are installed. Performance records show that KLIPLOKS pay for themselves over and over again.

WARNING
KLIPLOK Clamps are protected by patent and infringement will be rigidly prosecuted.

TRICO FUSE MFG. CO. DEPT. D MILWAUKEE, WIS., U.S.A.
IN CANADA—IRVING SMITH & CO., MONTREAL

COLORTOP FUSES
COLOR TELLS SIZE

OPTO-MATIC OILERS
SAVE OIL AND BEARINGS

FUSE PULLERS
NON-BREAKABLE

RENEWABLE FUSES
WITH
NON-INTERCHANGEABLE
TAMPER-PROOF
POWDER-PACKED
ELEMENTS

ONE-TIME FUSES
BUILT FOR SERVICE

DRIP-DROP OILERS
SAVE OIL AND BEARINGS

KLIPLOK CLAMPS
SAVE FUSES AND CLIPS

PREFERRED FOR QUALITY

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A 1937 SALES AID FOR WHOLESALERS

New BUYERS REFERENCE Number ELECTRICAL CONTRACTING

Hundreds of new products appear each year. Company names and addresses change. New companies enter the field. New trade names appear. *And smart wholesalers must have this information at their finger-tips.*

The Buyers Reference Number for 1937 contains literally thousands of new listings and changes, plus additional buying data of outstanding manufacturers. An experienced staff has been working for months to collect and compile all this information that will make the new Buyers Reference such a valuable aid for wholesalers in 1937.

Watch for your copy in December. There's a big year ahead and you'll need this up-to-date, dependable information to save time and money when buying.

THE BUYERS REFERENCE FOR 1937 WILL BE DISTRIBUTED TO WHOLESALER EXECUTIVES EARLY IN DECEMBER —ONE COPY TO EACH HOUSE

ELECTRICAL CONTRACTING • 330 W. 42nd ST., NEW YORK

dollar for each useful suggestion that is submitted in writing. According to S. J. O'Brien, this company has made several important improvements in its routine as a result of suggestion-box contributions.

AN UNUSUAL employment record is held by the Chattanooga (Tenn.) Armature Works in that none of its 30 odd employees have worked for any other motor service shop excepting a machinist and C. K. Stiprais, the shop superintendent. Mr. Stiprais is a 31-year man with the company.

LARGE reconditioned motors are returned to the customer equipped with a pulley key and bolts on each motor terminal lug by the General Electric Specialty Co., Jamaica, N. Y. This inexpensive added service is said to be highly appreciated by various customers, because they often misplace these items in the haste of sending a breakdown motor away for repairs.

TRENDS — Vertical panels of prismatic glass tile are being provided in the 200-ft. memorial tower of the new Fort Worth, Tex., civic center. These panels are to be rear-lighted with reflector strips and colored lamps. The Shotts Electric Co. of Ft. Worth has the job under way at this time. E. A. Shotts, Jr. is enthusiastic over the unique effect that is expected from this lighting method.

IT pays to be careful when making up lengths of conduit, says J. T. Massey of the Paramount Electric Co., Dallas, Tex. An electrician took a ½-in. coupling out of his pocket and attached it to a run of conduit without noticing a ½-in. washer that lay inside. The next length of conduit happened to screw up tight, leaving the washer setting edgewise between the butted pipes. When wire pulling time came, the trouble came to light, and an expensive chopping job was necessary.

THE completion of a local bakery modernization job by McKenzie & Separk of Raleigh, N. C., is a bit of romance in selling the message of adequacy to a prospering business man who began on a "shoe string." When Chas. P. Separk did his first power wiring some years ago, it was a case of pinching dollars, with a result that maintenance costs averaged $50 per month. By making changes here and there this cost was gradually cut down to about $20. When the last addition was made to this plant, Mr. Separk was given a free rein to provide for future changes, and to eliminate every possible source of maintenance. Last reports show that maintenance in the much enlarged plant is costing only an average of $10 per month.

★

Sangamo Form K, synchronous motor time-switch. Rated at 40 amperes, it covers a wide variety of applications. Form K is one of a complete line of Sangamo Time-Switches.

...that makes this installation COMPLETELY AUTOMATIC

CONTROLLING floodlights in factory yards is just one of the successful applications of Sangamo Time-Switches for industrial purposes. They can also be used to make completely automatic the control of—motors—electric heaters—mixers—production processes, etc. . . .

But . . . you must *first* explain to the plant superintendent how he can apply this unseen hand to his advantage. Try it! You will find that Sangamo Time-Switches are an excellent medium for aggressive selling.

SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

UMI

New Products . . for November . . .

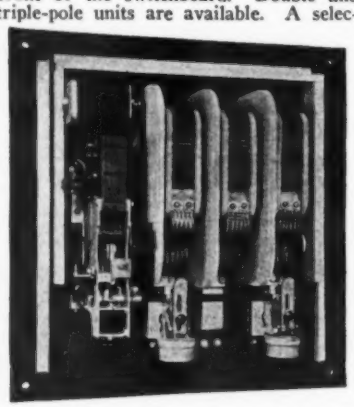
Pressure Switch

For the automatic control of small compressors and fluid pumps, the Bulletin 10016 pressure switch is said to offer

flexibility of application; trouble-free operation; protection to motor; and ease of wiring, adjusting and inspection. Inverse time limit overload protection is obtained by a thermal relay device which is said to protect the motor during starting and running. A reset button is provided which may also be manually operated to shut down the equipment. Pressure pipe connections are designed for S.A.E. fittings, and are easily convertible into ¼-in. or ⅜-in. pipe fittings. Cutler-Hammer, Inc., Milwaukee, Wisc.

Industrial Circuit Breaker

Type AE-1 air circuit breakers are adapted to industrial service, or for any heavy duty where many opening and closing operations are required. Interrupting rating of 20,000-amp. and for operation on circuits of 250 volts d.c. and 600 volts a.c. at 15 to 600 amp. The standard arrangement is an enclosed breaker with pull box for mounting on a wall or behind a switchboard panel; without pull box, for mounting on the front of the switchboard. Double and triple-pole units are available. A selec-



tive overload feature differentiates between overload and short circuits, time delay being provided up to six to ten times calibration setting and instantaneous above that. The mechanism is electrically operated, trip-free, and latched-in with a solenoid suitable for either a.c. or d.c. depending on rating. General Electric Co., Schenectady, N. Y.

High-Speed Photo-Cell

A photo-electric control unit for opening and closing electrical circuits in counting, sorting, weighing, alarms, and other industrial operations. Sensitivity and operating speed are said to have been doubled. A light source of 100-foot candle intensity is claimed to provide adequate energy for operating a 500-watt relay. The relay is arranged for single-pole double-throw operation with an overall speed of response of .15 sec., at the rate of 400 operations per min. This model 729 assembly comprises the

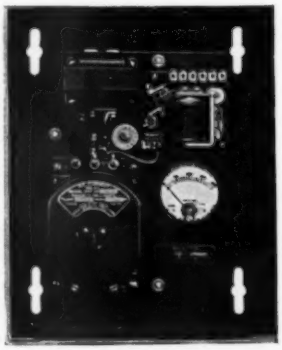


photo-cell in a protective mounting, the relay in a separate panel box, and a standard light source. A microammeter, calibrated in light units, is provided to show the level of illumination reaching the photo-cell, thus forestalling operating difficulties resulting from inadequate levels of light being maintained on the cell. Weston Electrical Instrument Corp., Newark, N. J.

Switchboard Switches

Electrically separate stationary contacts, larger escutcheon, water- and oil-tight housing, and removable handles are new features which have been incorporated in the Type SB-1 transfer and control switches to widen the scope of service. Electrically separate stationary contacts have been made possible by inserting a molded insulating compound barrier on the last stages to assure adequate clearance. With this design, most double circuit switching requirements can be met satisfactorily with a single stage switch. A new molded material escutcheon of the same general appearance as the standard, except that it is 4 in. high, has been designed to cover the panel drilling when a Type SB-1 control switch is to replace an old twin pull type of control switch. The new water- and oil-tight case is a non-corrodible metal housing with suitable gaskets to protect the included switch even to the point of complete immersion in water or oil. Three sizes are available, for 1 to 4 stages, for from 5 to 8 stages, and for from 9 to 12 stages. These housings can be adapted for use in explosive atmospheres. By means of a machined metal insert all handles can now be made removable and non-interchangeable. A suitable key and slot arrangement are provided to prevent removal of the handle unless the switch is in the proper position to permit the operation. General Electric Co., Schenectady, N. Y.

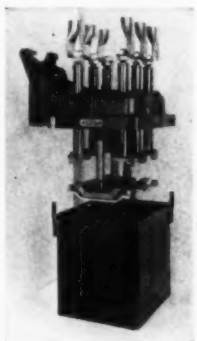
Vibration Damper

Rubber-to-metal mountings, known as Vibro-Insulators, for use with motor and other machine bases, for vibration damp-

ing. Type No. 1 (illustrated at left) is rated at a maximum load capacity of 800 lbs., and a minimum frequency of 800 vibrations per minute. Other types are available for loads from 50 to 3,000 lbs. and various vibration frequencies. The B. F. Goodrich Co., Akron, Ohio.

Oil Circuit Breaker

An oil circuit breaker for switchboard, cubicles and metal-clad switchgear arrangements, known as type E-47R, which is furnished for 600 amp. at 7500 volts and 800 amp. at 2500 volts. Interrupting capacity rating is 25,000 kva. It may be manual, solenoid, or motor operated. It has a totally enclosed high-speed mechanism, rigid cast frame, electrically welded steel plate tank with liner and



phase barriers, butt-type arcing contacts, and Bakelain bushings. Condit Electrical Mfg. Corp., Boston, Mass.

Watertight Connectors

A line of watertight connectors for use where conduit or cables terminate in outdoor devices, such as in meter enclosures. The No. 671 connector is designed for use with 1-in. conduit, and takes the place of a standard locknut. It has a rubber gasket which becomes compressed against the box wall for sealing the conduit opening. No. HA-63-U is designed for fastening to exterior wood surfaces by means of woodscrews. A rubber gasket becomes compressed around service entrance cable to seal the wall opening. No. 1402 con-

YOUNGSTOWN

BUCKEYE CONDUIT

★Conduit buyers who standardize on BUCKEYE Conduit protect themselves from all risk of irregular quality.

YOUNGSTOWN metallurgists and inspectors have perfected an intensive production-control which holds every shipment of conduit rigidly to standard.

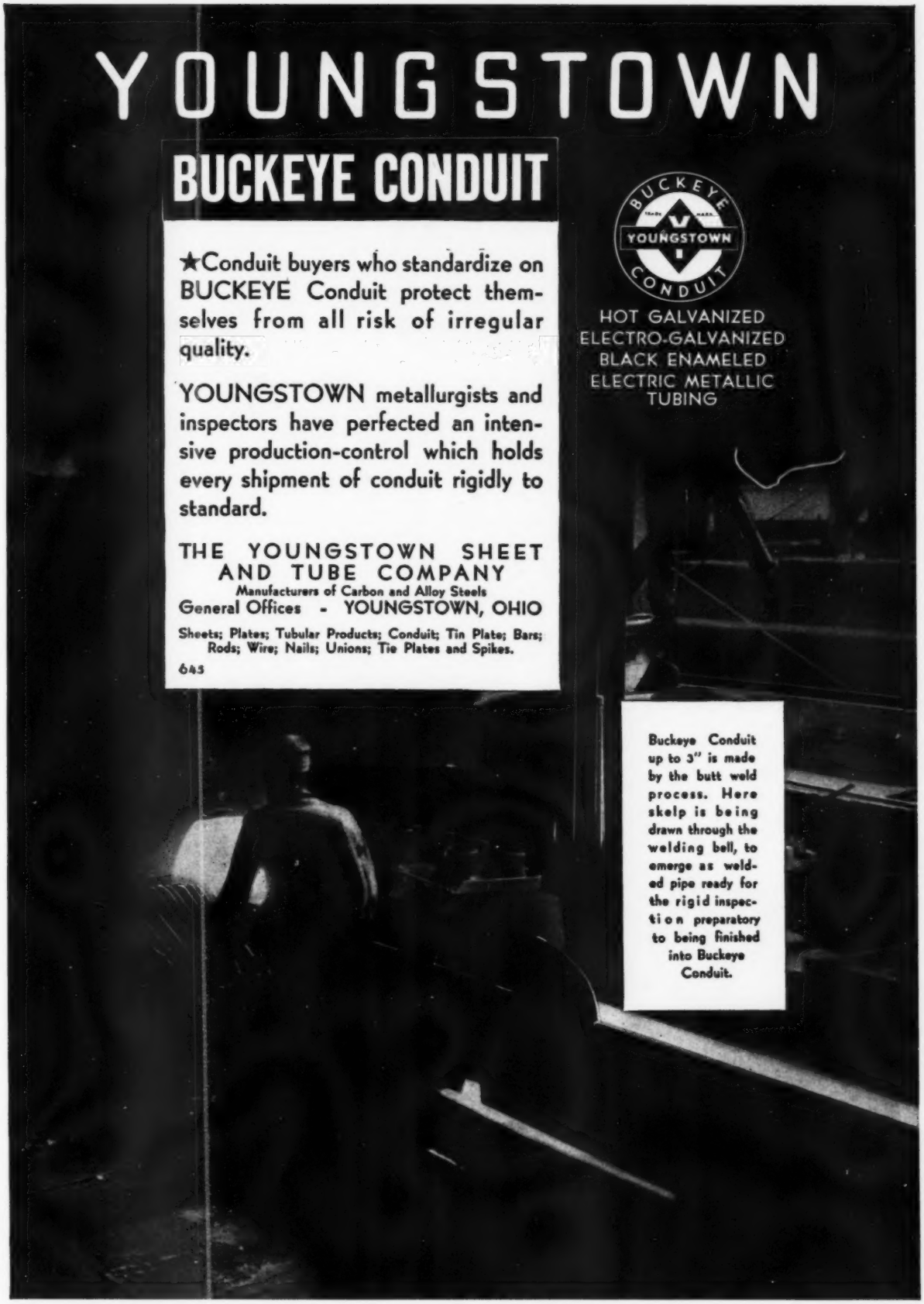
THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO

Sheets; Plates; Tubular Products; Conduit; Tin Plate; Bars; Rods; Wire; Nails; Unions; Tie Plates and Spikes.

643

BUCKEYE YOUNGSTOWN CONDUIT

HOT GALVANIZED
ELECTRO-GALVANIZED
BLACK ENAMELED
ELECTRIC METALLIC
TUBING



Buckeye Conduit up to 3" is made by the butt weld process. Here skelp is being drawn through the welding bell, to emerge as welded pipe ready for the rigid inspection preparatory to being finished into Buckeye Conduit.

UMI

nectors are designed to seal service cable where it enters the threaded hub connections of meter enclosures. No. A-63-U connectors are of the snap-in compression

type for use where cable is brought through the knockouts of meter enclosures. Two set screws may be tightened to compress the rubber gland against the metal wall. This fitting may be had in malleable iron or aluminum, with oval or round openings to fit various types and sizes of service entrance cable. Rattan Manufacturing Co., New Haven, Conn.

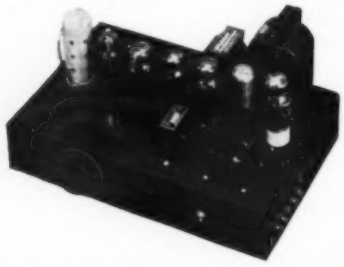
Porcelain Fixture

Modern designs are featured for the Alabax line of porcelain lighting fix-

tures. Made in various colors, with or without socket control. Pass & Seymour, Inc., Syracuse, N. Y.

Push Pull Amplifier

An amplifier for public address and station amplifier work with an output sufficient for one to four dynamic speakers. The amplifier circuit employs 6B5



tubes in push pull and a double channel input from low and moderate level sources, with either channel controllable by a single center-tapped potentiometer. Exceptional tone quality is claimed at all output levels. Jefferson Electric Co., Bellwood, Ill.

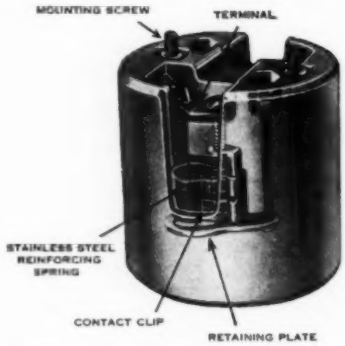
5 kw. Clock Switch

Little Giant Tork clocks provide motor-driven automatic control of lighting loads up to 5,000 watts. Made in single-pole, single or double throw, or double-pole, single throw. Silver switch contacts rated at 20 amp., the reduction of parts by 50 per cent, and the use of non-corrosive materials are design features. The 24-hour day is divided into four sections of six hours each, covering morning, afternoon, evening, and night. Settings

on variable schedules can be made quickly without the use of tools. The Tork Clock Co., Mount Vernon, N. Y.

Socket for Bi-Post Lamps

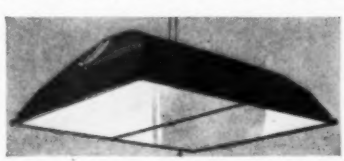
Porcelain sockets for the new bi-post prong-base lamps of 750 and 1000-watt, and 4000-lumen ratings. Made with enclosed contacts similar to fuse clips which engage the lamp prongs when they are inserted through retaining plates.



The lamp is rotated or twisted firmly until its prongs clip into place. The socket retaining plates employ "buttonhole" prong openings which are said to hold the lamp securely in place. The socket body may be had with 3/8 in. brass or aluminum caps, 3/8 in. yokes, or ½-in. aluminum caps. The Bryant Electric Co., Bridgeport, Conn.

Wide-Coverage Fixture

"Skylight" units are recommended for lighting shiny surfaces, such as plate glass, tin-plate and other material where soft glareless illumination of wide coverage is required. The fixture consists of a porcelain enameled trough type reflector 35 in. by 28 in. It has two medium



base sockets and an opal glass cover. Two or more of these units may be mounted close together to create an artificial luminous ceiling effect. Benjamin Electric Mfg. Co., Des Plaines, Ill.

Hand-Chain Hoists

A spur-geared hand-chain hoist in capacities from ½ ton to 6 tons. The use of precision-ground bearings to minimize friction is claimed to make a big reduction in the pulling or lifting effort required. To lift its rated load capacity one foot, the 1½-ton hoist is said to require a chain overhaul of 35 ft. and a chain pull of 100 lb.; the 3-ton hoist, 70 ft. chain overhaul and 101 lb. chain pull; the 6-ton hoist, 133.5 ft. chain overhaul and 117 lb. chain pull. A safety

load-chain guide is provided to keep the chain from riding out of the pocket or fouling, or leaving the wheel. The Conco Engineering Works, Mendota, Ill.

Mazda H.I.M.V. Reflector

The No. 1585 "Jerry" industrial units are designed for use with 300 or 500-watt Mazda lamps, or with 400-watt H.I.M.V. lamps. Recommended for

mounting above craneways and under or near skylights without danger of lamp breakage because of aluminum protective housings. Curtis Lighting, Inc., Chicago, Ill.

Lumiline Reflector-Raceway

A line of "Chan-L-ite" wiring raceways, designed to receive sectional porcelain enameled reflectors and lumiline lamp fittings. The channels are supplied unwired, in standard 9-ft. lengths, with

reflectors of either the No. 2005 flat overlapping, or the No. 2010 side-apron types. The No. 2000 channel is 1⅝-in. wide and 1 in. deep. Daybrite Reflector Co., St. Louis, Mo.

PANTHER *and* DRAGON *Tapes* MAKE $ALES

Panther and Dragon tapes sell easily and quickly. Their rapid tunover makes them a favorite with contractors and dealers everywhere. Are *you* getting your share of this business?

HAZARD INSULATED WIRE WORKS

Division of

THE OKONITE COMPANY

Factories: Wilkes-Barre, Pa. Passaic, N. J.

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Trade Notes . .

Cutler-Hammer Predicts Doubled Sales for 1937

"Due to improvements in our products and the improving business situation just ahead, I expect our merchandising sales in 1937 will be double those of this year," Vice-president G. S. Crane told forty representatives from the headquarters, sales, engineering and manufacturing staffs of the merchandising division of Cutler-Hammer, Inc., at a five-day conference at the New York factory recently. F. U. Webster, manager of merchandising sales, was chairman of the meeting and G. S. Crane, vice-president in charge of sales, was the principal speaker.

Burgess Buys Control in Thordarson Company

Dr. C. F. Burgess, president of the Burgess Battery Co. of Chicago, Ill., announces the purchase of the controlling interest in the Thordarson Electric Manufacturing Co. of Chicago. The Thordarson company will continue the manufacture of transformers for the radio and neon sign industry as well as other products in the process of development. Chester H. Thordarson, founder of the company, is president and Jackson Burgess is vice-president. The Thordarson line will continue to be merchandised under the Thordarson trade mark.

Cutler-Hammer, Inc., Milwaukee, Wis., announces the opening of its new plant at 970 Folsom St., San Francisco, Cal. Special control constructions, dead front switchboards, fuse cabinets and panelettes, panel boards, transformer cabinets and wiring troughs are being manufactured under the direction of R. R. Crooke.

Knox Porcelain Corp., Knoxville, Tenn., has let a contract to the Allied Engineering Co., Cleveland, O., for a circular continuous kiln. During the last five or six years this company's lines have been broadened to such an extent that several plant and equipment additions have been necessary. With the addition of this new firing equipment this plant will be one of the most modern and up-to-date in the country.

Curtis Lighting, Inc., Chicago, Ill., announces the appointment of W. L. Brandel to its national sales force, in charge of X-Ray reflector and floodlighting equipment sales. Mr. Brandel is well known to the lighting industry, having been for 15 years with the incandescent lamp department of the General Electric Co.

George W. Duncan, who was connected for sixteen years with the fractional motor department of the General Electric Co. at Fort Wayne, Ind., has joined the sales staff of the Ohio Electric Mfg. Co. at Cleveland, O. as assistant motor sales manager.

Van Cleef Bros., Chicago, Ill., has recently broken ground for a 20,000 sq. ft. addition to its plant. This is the fifth addition made in the last fifteen years to a plant that occupies about two acres.

Copperweld Steel Co., Glassport, Pa., announces the appointment of Leo N. Blago as field representative in its southeastern district, with headquarters in the Hurt Bldg., Atlanta, Ga.

Trade . . . . . Literature . . .

Non-Ferrous Conduit: An 8-page bulletin describing P-M-G rustless bronze rigid conduit, electrical metallic tubing, outlet boxes and fittings. Corrosive acids and reagents which these products are claimed to resist are named, as well as a listing of corrosive and hazardous locations. Phelps Dodge Copper Products Corp., New York, N. Y.

Distribution Transformers: Loose-leaf bulletin 180, 102 pages, on single and three-phase distribution transformers and accessories as well as air-cooled and instrument transformers. Wagner Electric Corp., St. Louis, Mo.

Air Conditioning: Catalog 436 and instruction book 436A on air conditioning and cooling equipment. The instruction book has been arranged to make air conditioning estimating as simple as possible without using rule-of-thumb methods. Ilg Electric Ventilating Co., Chicago, Ill.

Floodlights: 28-page catalog on Novalux floodlighting equipment with tables for solving floodlighting problems. General Electric Co., Schenectady, N. Y.

Distribution Cutouts: Bulletin 215-A, 16 pages, covering open and closed distribution cutouts, reclosers and fuse links, with dimensional drawings, ratings and data for equipment from 5,000 to 46,000 volt service. Schweitzer & Conrad, Inc., Chicago, Ill.

Cables and Conduits: Catalog T, 48 pages, listing the entire line of wires, cables and conduits. Triangle Conduit & Cable Co., Brooklyn, N. Y.

Illumination Design: A pocket size handbook of 96 pages containing seven sections devoted to the design of interior, built-in, display and sign lighting; floodlighting; underwater, street and highway lighting. A discussion of H.I.M.V., when used alone or in combination with Mazda lamps, is included. Copies are available for 10c each from the Commercial Engineering Dept., Westinghouse Lamp Co., Bloomfield, N. J.

Pipe Machines: An 8-page bulletin describing Beaver Model-A special and standard pipe machines. Beaver Pipe Tools, Inc., Warren, O.

Capacitors: Leaflet giving 12 actual examples of power savings through the use of capacitors. General Electric Co., Schenectady, N. Y.

Porcelain Lighting Fixtures: The "Alabax" line of porcelain lighting fixtures is illustrated and described in catalog AL-2. Pass & Seymour, Inc., Syracuse, N. Y.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of Electrical Contracting, published monthly, at Albany, N. Y., for October 1, 1936.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared D. C. McGraw, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Electrical Contracting, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, N. Y. C. Editor, S. B. Williams, 330 West 42nd Street, N. Y. C. Managing Editor, None. Business Manager, Glenn Sutton, 330 West 42nd Street, N. Y. C.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, N. Y. C. Stockholders of which are: James H. McGraw, 330 West 42nd Street, N. Y. C. James H. McGraw, Jr., 330 West 42nd Street, N. Y. C. James H. McGraw, James H. McGraw, Jr., & Malcolm Muir, 330 West 42nd Street, N. Y. C., Trustees for: Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw, Curtis W. McGraw, 330 West 42nd Street, N. Y. C. Donald C. McGraw, 330 West 42nd Street, N. Y. C. Anne Hugus Britton, 330 West 42nd Street, N. Y. C. Mason Britton, 330 West 42nd Street, N. Y. C. Grace W. Mehren, 33 West Grand Ave., Chicago, Ill. J. Malcolm Muir & Guaranty Trust Co. of New York, Trustees for Ldia Kelly Muir, 524 Fifth Ave., N. Y. C. F. S. Weatherby, 271 Clinton Road, Brookline, Mass. Midwood Corporation, Madison, N. J. Stockholders of which are Edwin S. Wilsey, Madison, N. J. Elsa M. Wilsey, Madison, N. J.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is (This information is required from daily publications only.)

D. C. McGRAW, Secretary.

McGRAW-HILL PUBLISHING COMPANY, INC.

Sworn to and subscribed before me this 28th day of September, 1936.

[SEAL] H. E. BEIRNE, Notary Public.

Nassau County, Clk's No. 74 N. Y. Clk's No. 192. Reg. No. 8-B-115.

(My commission expires March 30, 1938.)

LABEL ALCOA ALUMINUM BUS BAR *Economical*

Above, the main bus in this switchroom was installed 22 years ago, in 1914, and the jumpers seen in the foreground were installed 7 years ago, in 1929. The operating record shows "continuous, trouble-free service." Both the main bus and the jumpers are Alcoa Aluminum.

To say that an Alcoa Aluminum Bus System costs less is to say that it is better, if you include the whole picture.

Here, in a few words, is the picture: Alcoa Aluminum bus is 52% lighter. Since it is more easily handled, and more easily formed, installation costs less. Often runs may be placed high, conserving floor space and adding to convenience, without constructing special supports. Spans between supports can be longer. Splices, taps and joints are easily welded, or bolted. Fittings are simple and inexpensive.

For special problems Aluminum bus has special answers. Because it is naturally corrosion resistant, it is suited to plating room installations and other uses where corrosive fumes may cause trouble. When mechanical strength is needed, Channeluminum, the rolled Channel section, provides maximum physical strength, as well as the ultimate in electrical and thermal efficiency.

These advantages are all dollars-and-cents advantages; you can put the mental tag "Economical" on your conception of Alcoa Aluminum bus bar. And when you want actual figures and data, write to ALUMINUM COMPANY OF AMERICA, 2197 Gulf Bldg., Pittsburgh, Pa.

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ALCOA · ALUMINUM

If you use TRANSFORMERS *you will be interested in latest developments by* AMERTRAN

Type CFT three-phase, outdoor-type, air-cooled transformer

Types CF and CFT

- Air-cooled—no oil nor fireproof vault.
- Conduit Fittings—easy to install.
- Single-Phase or Three-Phase types.

AmerTran Air-Cooled Transformers and Auto-Transformers reduce operating costs . . . they may be used on single- or three-phase circuits for supplying 115/230 volts for lighting or power from 230-, 460-, 575-, or 2300-volt power circuits so that advantage may be taken of the lower power rates. Other standard types are furnished for phase-changing, voltage boosting and operating low-voltage equipment. AmerTran is also prepared to furnish many other types of transformers, including types for distribution, power, testing, welding, etc. May we have the opportunity to send information on equipment to meet your requirements?

Type CF single-phase, outdoor-type, air-cooled transformer

AMERTRAN

American Transformer Company
160 Emmet Street
Newark, N. J.

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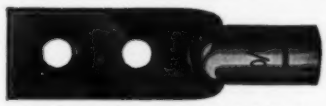

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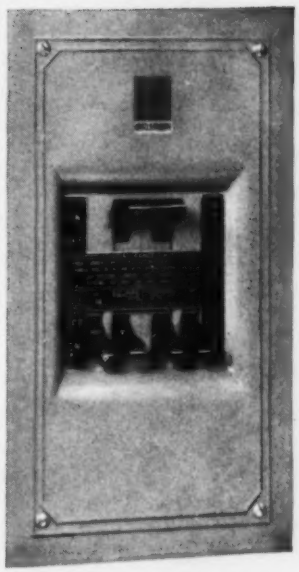

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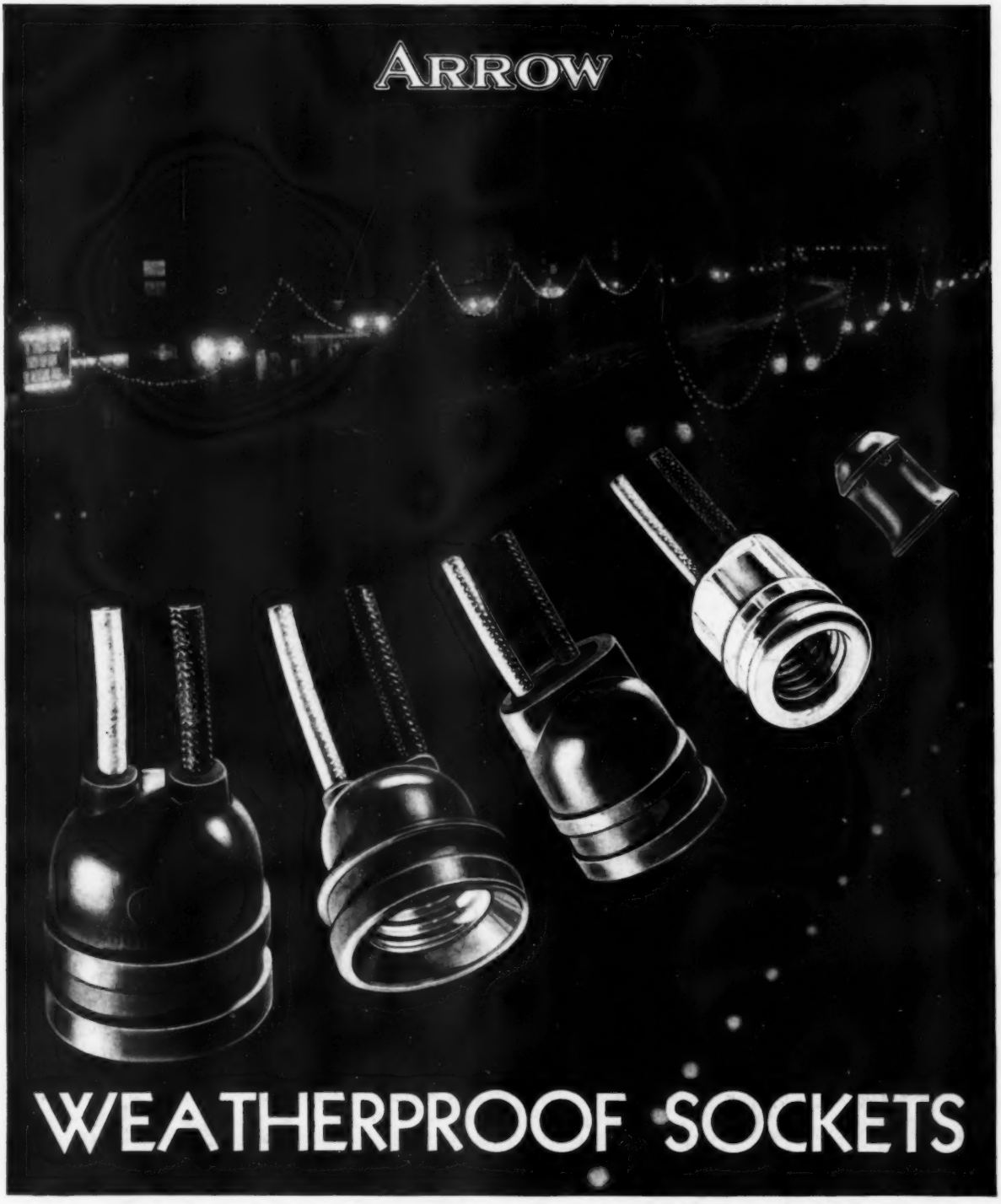

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